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Vol. 20 MAY, 1934 No. 5

MAY 1 1934

International Journal of Orthodontia and Dentistry for Children

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Published by The C. V. Mosby Company, 3523-25 Pine Blvd., St. Louis, U. S. A.

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International Journal of Orthodontia and Dentistry for Children

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International Journal of
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VOL. 20 ST. LOUIS, MAY, 1934 No. 5

ORIGINAL ARTICLES

THE INTERRELATIONSHIP BETWEEN ORTHODONTIA AND PEDIATRICS*

LOUIS FISCHER, M.D., NEW YORK, N. Y.

THAT there should be teamwork between the two branches of medicine is understood. But is this true? Is it not a fact that the child sees the orthodontist after there is a malocclusion or after there is a marked deformity in the mouth resulting from abnormal metabolism and after the real systemic damage is done?

The pediatrist sees the infant at birth. He has an opportunity to study the defects of the osseous system if present, but in a majority of cases the pediatrist is not consulted until the infant shows definite symptoms of abnormalities or disease which worry the mother or nurse. Early deformities of the jaws attendant to malocclusion may, however, have already commenced, and it is only the most watchful mother who can detect this incipient orthodontia case. I believe that one reason for this lies in the fact that until comparatively recently young mothers were under the impression that the deciduous teeth need not be cared for because they will be displaced within a short time. The modern dental and medical literature, however, is generously sprinkled with articles showing the fallacy of this belief, and I believe that most pediatricians are making sincere efforts to educate the young mothers of today. Of course, the economic problem will always be present and can only be disposed of by the orthodontist when the patients apply for treatment.

The development of the child, with especial reference to its bones, muscles, and teeth, requires prenatal supervision; hence, every woman's teeth should be inspected during pregnancy. Diseased teeth, if present, require proper attention, and if any extractions or other oral operations for the elimination of infection are necessary, they should be done preferably between the third and sixth months of pregnancy. During the prenatal period close attention should be

*Read, by invitation, before the New York Society of Orthodontists, Nov. 20, 1933.

paid to the health of the gums, and frequent prophylactic treatments should be given the mother. If careful dental supervision is maintained, epulis characteristic of pregnancy may be diagnosed and removed before any harm has been done. Not only the teeth and gums but also the entire body of the mother should be carefully examined, as it is of the utmost importance to have a check-up of all disorders which can be improved or eradicated before the birth of the child. In my book, *The Health Care of the Baby,** advice is given concerning prenatal supervision of the mother, and especial reference is given to blood disorders, and to inherited diseases such as epilepsy, rheumatism, alcoholism, tuberculosis, and syphilis. Of course, all foci of infection, such as diseased tonsils, must be treated in order to guard against autointoxication.

It is important to aid normal metabolism by ordering a diet which will give in addition to the usual component parts a liberal supply of mineral salts, vitamins, and antirachitic factors so necessary for the development of a healthy infant. When an insufficient quantity of milk is taken, we can aid by prescribing a sufficient quantity of calcium such as the gluconate of calcium tablets, for several months if necessary, and thereby aid in developing a foundation of normal teeth. Why wait for a weakly infant to be born when cod liver oil and calves' liver given to a pregnant mother will aid nutrition during pregnancy and aid in the metabolism of her body? Pregnant women should exercise out of doors and sleep or rest when exhausted. The use of alcohol or tobacco can best be regulated by the advice of the family physician, but moderate use of the above will not be detrimental to a healthy mother during the pregnancy.

Modern tendencies on the part of some obstetricians to reduce the weight of the infant and thus aid nature in giving birth to a smaller child are not without their dangers. One must consider that many of the proteins, carbohydrates, fats, and mineral salts must thereby be excluded from the dietary, and the ultimate result may be a smaller child, but it may also retard the development of the bones, muscles, and teeth to the detriment of the infant. The present fad of dieting among modern young women who cut down many of the most important articles of diet certainly does not help them nor does it add many years to their lives; on the contrary, I believe that the vast majority of women who insist on continuous dieting do harm, devitalize their bodies, and are more prone to infections and disease, and really shorten their lives. It stands to reason that in such bodies pregnancy suffers by reason of the depletion of the usual diet.

There is a popular belief that because an infant is fed on the human breast, a normal baby will result. In many cases this is true, but in many cases it is not true because human milk may be deficient in quality or quantity if the mother is sick during lactation or if her food has not been adapted for lactation. How often have I seen rickets in the breast-fed infant, especially where the infant is nursed while the mother is pregnant or where the infant is nursed whenever it cries—in some instances given twenty or more feedings in twenty-four hours. An interesting series of papers have been published by Alfred Hess in 1922, *Journal of the American Medical Association,* in which he and his staff, especially Jacques Lewis, state that "Woman's milk contains

*Funk & Wagnalls, 18th ed.

only about one-fifth as much phosphorus as cow's milk and rickets occurs far less than in cow's milk fed babies which indicates that phosphorus intake does not play the deciding rôle.'' One must be impressed by the reports of various observers that rickets in the Islands of the West Indies is almost non-existent among the negro and white population in this geographical area. But let them migrate to the U. S., then rickets is prevalent. As regards the negro, this susceptibility is due in part to the pigment of the skin which filters out the ultraviolet rays.

In the older child there is a frequent tendency to eat rapidly and to bolt the food. Whereas this habit is frequently caused by hunger or lack of proper instruction in the art of eating, it may occasionally be due to soreness of the gums or pains in the teeth. The average child is more or less reluctant to go to the dentist and will resort to many different subterfuges in his effort to avoid going. This reluctance, together with some of its causes and a few of the methods of dealing with it, will be discussed later in this paper. Because so much has been written on the subject of feeding, a great many modern mothers have a tendency to follow the instructions of their favorite dietetic adviser, word for word.

Mass feeding is no more possible than it would be to prescribe a shoe which must fit every child at two, four, or six years of age. Individual conditions must be studied. Defects must be remedied and deficiency aided in order to restore normal health. A well-balanced diet for a child weighing 20 pounds at one year is not adapted for a child weighing 16 pounds at one year. In a paper I read before the Society for Experimental Biology and Medicine one-half dozen years ago, I gave a summary of 900 children examined by my staff and myself in which more than 200 children, rachitic suspects, were given a radiographic examination.* In all, 37 cases of these showed typical rickets both severe and mild. The rachitic manifestations most noted were scoliosis and kyphosis and pronounced cupping and fraying at the ends of the ulna and radius. Many of these infants were given constant sunlight on the roof of the Heckscher Foundation; others were given the benefit of the ultraviolet ray with a radical change of diet, but it was not until cod liver oil was ordered—and then within two weeks after its use—that not only did the bones show a marked healing tendency and a decided calcium deposit but also the teeth erupted and the general condition was one of improved appetite, better sleep, and marked improvement in the general metabolism.

Case 1.—A. H., ten months old, was admitted at the infantorium with a history of backwardness in sitting, no teeth, unable to support head and spine, profuse perspiration, and slight injury to the head. Child had been previously admitted to the St. Luke's Hospital with a subperiosteal hemorrhage; cried most of the time as though in pain, and was very restless. Clinical diagnosis: rickets and scurvy.

Radiographic examination showed irregular worm-eaten lower ends of the right and left radius and ulna, the right and left tibia and fibula. No evidence of scurvy. This case is typical of the severer forms of rickets encountered.

*Dr. Charles Gottlieb was the roentgenologist.

Egg yolk and spinach juice, butter, and lemon juice were added to the diet. In addition, the child was exposed to sunlight. A gradual improvement was noted, but specific deposition of calcium and healing took place only when fresh cod liver oil was administered.

Case 2.—Baby G., aged eleven months, had been suffering with constipation, anorexia, and insomnia; restless by day and seemed dissatisfied. There were marked craniotabes and also beaded ribs. The epiphyses of the ulna and the radius were large and spongy. Clinical diagnosis: severe rickets.

Radiographic examination confirmed diagnosis.

The quartz lamp therapy was tried with a radical change of diet in which cereals, vegetables, eggs and milk formed the chief bulk of food. No definite improvement was noted by x-ray examination until cod liver oil concentrate was given. Four weeks later the rachitic manifestations were practically undiscernible. Shortly thereafter we noticed the sudden eruption of four teeth; the craniotabes became less marked; the appetite improved and constipation disappeared.

Case 3.—C. M., aged seventeen months, was admitted because of inability to stand or walk. Crackling râles were heard at the right base posterior; marked dyspnea at times. Child had large pendulous belly and screamed night and day. Admission diagnosis: inanition, tuberculosis, and probable meningitis. Lumbar puncture was performed, 30 c.c. of clear fluid were withdrawn; no tuberculosis bacilli or other organisms were found. Spinal fluid reported normal. X-ray examination of the chest showed enlarged bronchial glands; no evidence of consolidation or tuberculosis. Radiographic examination showed an advanced degree of rickets, as indicated by marked cupping of lower ends of tibia and fibula, and lower ends of radius and ulna. There is evidence of old fracture through the right radius and ulna, and through the left fibula. Diagnosis: rickets, kyphosis.

The treatment first consisted of exposure to the mercury vapor quartz lamp for four minutes on the first day. Later, the child was exposed five, six, and up to ten minutes daily or every two days, depending on the amount of skin tolerance. Some infants burn easily and show erythema lasting one or more days. This treatment did not result in specific healing of rickets.

Following the administration of one tablet of cod liver oil concentrate daily for a period of two weeks, the radiograph showed a decided deposition of calcium. At the end of three weeks, healing had progressed very rapidly.

Case 4.—H. L., six months old, bottle baby. Was born in California amid sunshine and fresh air. Its hygienic supervision was of the best. The infant's feeding was supervised by a well-known pediatrist, and the metabolism as far as the history is concerned was perfect. The bowels were inclined to constipation. The infant weighed five and one-half pounds at birth and gained steadily, although the gains were not very large. Two symptoms were noted—profuse perspiration and restlessness at night. At six months the infant weighed about ten pounds, the muscles were flabby, and there was marked craniotabes. The

x-ray examination showed pronounced cupping of the ulna and radius. We also noted a scoliosis. Weekly x-ray examinations were made to study the progress of the calcium deposit in the bones.

Some improvement followed the administration of cereals and vegetables during the first month of treatment; exposure to sunshine was resorted to when possible. The progress noted was gain in weight, better color, less restlessness, and better appetite. Other clinical progress was the sudden eruption of teeth, and the ability to hold the head up. The kyphosis improved but slightly. The x-ray examination, however, disappointed us after one month's treatment, very little change in the bones being noted. Cod liver oil was then ordered, in the form of a tablet containing the equivalent of one-half teaspoon of cod liver oil, three times a day. Rapid progress of the calcium deposit and healing of rickets within a few weeks of treatment were observed.

Chemistry has aided us during the last few years in securing very many forms of concentrated cod liver oil adapted for children, and most of these if not all that I have used are excellent. Viosterol has now attained a national reputation with pediatrists. As a prophylactic it may be given in 10 minim doses or more once a day. Some younger infants during the first three months do well on 5 drops of viosterol combined with orange juice daily. Two drops of haliver oil equal 1 teaspoon of cod liver oil with vitamin A activity. Each gram contains more than 50,000 vitamin A units and more than 2,000 A.D.M.A. units (200 Steenbock units) of vitamin D. One of the best cod liver oils on the market, well standardized and which I employ continuously, is the Mead Johnson preparation. Upjohn's Super D cod liver oil is biologically assayed for vitamin A and for vitamin D. Children may be given ¼ to 1 teaspoonful one or more times a day.

From the foregoing case histories it is apparent that the judicious use of cod liver oil in conjunction with proper diet is an essential factor in the production and maintenance of healthy bone. Moreover, it should be noted in these cases of children suffering from metabolic disturbances due to improper diet, that the addition of cod liver oil not only corrected the rachitic disorders but stimulated the eruption of the teeth. At this point a few words may be added as comment upon a tendency which has, of late years, cropped out among all members of the healing art and that is the inability of some doctors to resist the temptation to prescribe treatments or medicines for patients whose immediate health problem is manifestly outside the scope of the prescriber. It is just as wrong for a physician to pass an opinion upon the treatment of malocclusion as it is for the orthodontist to prescribe or suggest cod liver oil or other dietary adjuvants. These matters had best be left in the hands of the man properly qualified to regulate their control.

Although the pediatrician is the first to be in an authoritative position to observe early tendencies toward malocclusion or other jaw deformities, I feel, nevertheless, that the orthodontist should be consulted through the medium of the family dentist in preference to a direct recommendation from the physician. Most people consult the family physician before visiting a surgeon, for example; and in like manner, I believe the general practitioner of dentistry should have the opportunity of passing upon the merits of the case before the specialist who

straightens the teeth is consulted. Many times patients are needlessly frightened by a thoughtless remark made by the pediatrician which can be best explained by the family dentist. Doubtless there are some physicians who advise their patients to have deciduous teeth straightened, and certainly it does not take an orthodontist to correct this misconception.

The obligation of the physician to the orthodontist, in my opinion, commences in the earliest stages of a baby's existence. Naturally, we do not know which babies will need orthodontia and which ones will receive it, but if the factors which tend to stimulate the normal healthy growth of bones and teeth are conscientiously observed, the pediatrician is doing his share toward cooperating with the orthodontist.

In the foregoing recital of case histories it was shown that the lack of the proper amount of cod liver oil retarded bone and tooth development. The other important elements so essential to growth, namely, sunlight, fresh air, exercise, sleep, proper clothing, vitamins, carbohydrates, proteins, and fats, must all be present in their respective proportions; otherwise the infant will not thrive in the best possible manner known to medical science. The pediatrician has no control over the child's inherited anthropologic characteristics, and here, of course, is orthodontia's chief mission. The malposition of tooth germs is also a phenomenon with which the pediatrician cannot concern himself. But, in addition to the supervision of the child's diet, he can certainly go a long way in helping to prevent some of the characteristic jaw deformities seen in the mouth-breathers, in thumb-suckers, in children with enlarged adenoids and tonsils, in fact in all children who show an early tendency toward some oral or naso-pharyngeal disease. According to Hess, infants were not protected by giving the mother cod liver oil during the last two months of pregnancy. On the other hand, the fact that premature infants are susceptible to rickets shows that prenatal nutrition does play a rôle. "Although it is generally accepted that the occlusal surface of the crown of the first permanent molar is calcified at birth, roentgenograms and anatomical dissections showed that this tooth is practically uncalcified at this early period. Calcification of the first molars and other permanent teeth must be regarded as a postnatal rather than prenatal phenomenon. The deciduous molars were less calcified than is commonly supposed."[16] According to these authors it would seem advisable to provide the child with calcifying factors throughout childhood rather than to limit our efforts to the period of infancy.

Once the child has come under the care of the orthodontist, the latter assumes a responsibility far more serious than is generally suspected. Whereas the pediatrician sees the child at most semiannually, unless the parents have found it necessary to call him because of quite evident illness, the orthodontist sees the child several times monthly. Thus he becomes in a sense the unofficial lookout for diseases which give intraoral clinical symptoms.

It is obviously impossible for me to go into the matter of the diagnosis of the diseases of childhood, particularly the infectious and contagious ones. Those of you who believe that pediatrics embraces chiefly the correction of the diet of children would do well to spend a few hours reading any good textbook dealing with children's diseases. You will be startled to discover the number of

very serious contagious diseases whose earliest symptoms appear on the cheeks, gums, tongue, and throat. As an amateur diagnostician, the orthodontist is probably in the most favorable position to be of especial help to the child and its parents because his cooperation in noticing any symptoms of disease in the oral cavity and reporting them will entitle him to lifelong esteem on the part of the family. The pediatrician, as well, will also appreciate this alertness on the orthodontist's part and will certainly look upon him as something more than a tooth regulator. Modern science has given us so many avenues of attack in dealing with these infectious diseases of childhood that our problem is chiefly one of getting the child under treatment as early as possible. Many lives will be saved in years to come by the ability of dentists to observe the oral manifestations of disease and by their reporting them immediately.

There are at least thirteen major disorders of childhood whose definite clinical symptoms appear in or about the mouth at a very early stage. I shall not attempt to do more than mention some of these diseases and give a brief description of their oral symptoms.

1. Tonsillitis. This is an acute inflammatory lesion characterized by an engorgement of the tonsillar tissues on one or both sides of the uvula accompanied most often by yellowish-white patches. Because of the congestion the child always has difficulty in swallowing, and the temperature is between 101° and 105°. Vincent's infection may often be the cause of tonsillitis or may accompany it.

2. Diphtheria is an acute infectious disease caused by the invasion of Klebs-Löffler bacillus. The mouth, throat and especially the tonsils frequently harbor this bacillus, but in a healthy individual it will lie dormant. However, when it becomes active the reaction is a violent one. On one or both tonsils a yellowish or greenish-yellow membrane will be seen, and characteristic foul odor accompanies it. The uvula is intensely congested and may be covered with a membrane. The submaxillary glands are usually involved by the time the membrane appears. The pulse ranges between 100 and 130, and the temperature may fluctuate between 100° and 105°. Needless to say, in this as well as in all other cases of suspected contagion, the observer must notify the family or preferably the family physician immediately, as the danger to the child's life as well as the possibility of communication of the disease to other children is very serious. No orthodontist should work on a patient with a mouth or throat infection until a physician has passed on its danger of contagion.

3. Measles is an acute eruptive disease associated with fever. It is highly contagious and to a less extent infectious. The earliest symptoms of measles appear in the mouth—not on the skin as most laymen believe. The characteristic intraoral picture shows bluish-white dots very close to one another on the cheek along the plane of the maxillary and mandibular molars. The tongue is covered with a white fur, and the papillae are red and swollen. The child usually coughs moderately and the fever ranges from 101° to 102°.

4. Scarlet fever is an acute infectious and contagious disease ushered in by vomiting and sore throat accompanied by fever. After the first few days following the onset, the pharynx, tonsils, and uvula are intensely congested, and the hard palate shows minute reddish areas; patches of pseudomembrane appear

on the throat and there is fetor to the breath. The so-called "strawberry" tongue is characteristic of scarlet fever with its elevated and very red papillae. The submaxillary lymph glands usually react quite strongly and are enlarged and sensitive. The pulse becomes very rapid, usually above 140, and the temperature fluctuates violently.

5. Mumps or parotitis is an acute infectious disease with a slight rise in temperature and is characterized by a swelling and tenderness of the parotid glands. It usually occurs in epidemic form and is readily diagnosed by the swelling behind the angle of the jaw and under the ear. The swelling in the parotid region should not be mistaken for cellulitis resulting from a suspected tooth infection.

6. Rickets or rachitis is a nutritional disorder which commences shortly after birth but may persist through infancy and early adolescence. It affects the bones primarily, and for this reason the orthodontist should be familiar with the medical history of the patient. The most prominent symptoms which would be visible to the dentist are bowlegs, delayed dentition, and a slight enlargement of the frontal portion of the head. A slight deformity somewhat resembling hunchback generally accompanies the disease in older children.

7. Scurvy is a deficiency disease resulting from improper feeding in the sense that the diet has for some time past lacked the antiscorbutic vitamin. The disease is characterized by general debility, anemia, spongy gums, and a tendency to spontaneous hemorrhages. The absence of fresh fruits and fresh vegetables from the diet for any length of time will bring about the onset of this disease. In children brought up on condensed milk this disease will frequently be found. The intraoral symptoms present anywhere from a slight to a very marked gingivitis frequently hypertrophied. The gingivae show a characteristic bluish line around the teeth, and subgingival hemorrhages occur frequently.

8. Leucemia is a disease of the blood in which there is an enormous increase in the number of white blood cells. In the lymphatic type all lymphoid tissue in the body including the tonsils becomes enlarged, and the lymphatic glands become palpable. In the mouth there is present a marked hypertrophic gingivitis which subsides only when the blood picture becomes more normal.

9. Tuberculosis may give several different types of manifestations in and about the mouth. Enlarged tonsils may occasionally be tuberculous, but as the tonsils are seldom, if ever, the site of the primary lesion, it is highly improbable that the diagnosis would first be made by the dentist. Frequently the only clue to a beginning miliary tuberculosis will be a rapid fluctuation of the temperature from subnormal to 103°, accompanied by a tenderness of the cervical chain of lymph glands. The presence of a persistent sore on the lip should always be looked upon with suspicion.

10. Primary infection in the mouth is by no means rare in syphilis, and frequently mucous patches may be found in the mouths of children who have acquired this disease innocently. Transmission through the nipples of a wet-nurse was not unknown in the past. When catarrh is persistent in a child and not amenable to ordinary treatment, lues should be suspected. The well-known characteristic Hutchinson's teeth need not be described to an audience of dentists.

11. Herpes. Herpetic eruptions are frequently seen on the lips and in the mouth. They are usually yellowish-white blisters. They are associated with acute gastric disorders—fever, thirst, anorexia, and foul breath are the usual symptoms present.

12. Vincent's stomatitis is occasionally seen in children and may involve the tonsils and throat as well as the gums. This infection is accompanied by a characteristic inflammation of the gingivae or other tissues which it invades accompanied by slight hemorrhages, and in its more advanced stage becomes ulceromembranous. These membranous patches may be seen usually along the mucobuccal fold or on the cheek, the floor of the mouth, the hard palate, and the tonsils. There is also a characteristic foul odor to the breath. When patches are seen in the throat, a differentiation must be made between tonsillitis, diphtheria, and Vincent's stomatitis. It is, of course, entirely within the province of the orthodontist to treat the latter, particularly if it may be due to improper mouth hygiene accompanying the wearing of an appliance. In the past, one of the most effective means of combating this disorder has been through the application of sodium perborate in the form of a paste. I find, however, that 5 per cent potassium permanganate or 1 per cent chromic acid used as a mouth wash every few hours together with 10 per cent neosalvarsan in glycerin applied locally daily promotes a cure for Vincent's infection in a very short time. In severe acute infections accompanied by high fever I have sometimes found it necessary to inject neosalvarsan intravenously.

13. Stomatitis is occasionally met with in conjunction with an acute gastric catarrh—an overloaded stomach due to a diet very rich in fat where too much butter, bacon, and oil have been ordered. This will result in fever, vomiting, and sometimes little patches in the mouth. These disappear easily when the stomach is treated by giving bicarbonate of soda or glucose internally.

Babies are very prone to Bednar's aphthae. These are small white patches usually on one side of the throat, caused by friction with cheesecloth or linen on the nurse's finger when washing the mouth. This forcible friction denudes the epithelium and causes these white patches. They disappear without any treatment if the parts are rested.

I have already mentioned diphtheria and syphilis as factors causing ulceration, but also there is noma, which is a gangrenous stomatitis. Such ulcers usually appear on the inner side of the cheek, and if neglected will so ulcerate that perforation of the cheek takes place. There is an extremely foul odor, gangrenous, which pervades the immediate vicinity of the patient, and once the ulcer is seen, it will never be forgotten. To deodorize such a case, nothing is better than frequent spraying with permanganate of potassium solution 1 per cent or 20 per cent peroxide of hydrogen. I saw noma several times during a severe epidemic of scarlet fever, and because of its destructiveness I tried the use of neosalvarsan intravenously with excellent results. One can therefore see that there must be some systemic reason for such disease. Locally we also insufflated a small quantity of neosalvarsan once a day and gave the intravenous dose of neosalvarsan 0.2 dissolved in 40 c.c. of sterile water. The jugular and the median basilic veins were the most convenient vessels used for the injection.

I should like to describe more in detail the chief points of three of the aforementioned diseases: rickets, congenital lues, and scurvy.

Rickets

1. Disease occurs in the very young, especially during the first two years.
2. The joint is intact, the epiphyseal line softened and spread out (saucer shape).
3. Atrophy is present with frequent occurrence of fractures.
4. Periostitis generally is absent, though occasionally present.
5. Marked pulmonary changes are present.
6. Deformities of the bones are noticeable.
7. No subperiosteal hemorrhages exist.

Congenital Lues

1. The disease occurs in the very young, especially during the first two years.
2. The joint is intact; there is no spreading out of the epiphyseal line, but gouged areas are present in the diaphysis.
3. No atrophy takes place, consequently fractures occur but seldom.
4. Periostitis is practically always present and generally excessive.
5. No pulmonary changes are present.
6. No deformities are present.
7. No periosteal hemorrhages exist.

Scurvy

1. The disease occurs in the very young, generally in the first and second years.
2. The joint is intact. The epiphysis and epiphyseal line are not disturbed, but a destructive zone is formed just behind the epiphyseal line.
3. Atrophy is occasionally present. Fractures are infrequent; the epiphysis is occasionally dislocated by hemorrhage.
4. Periostitis is practically always present.
5. No pulmonary changes are present
6. No deformities but occasional tumor masses are present, due to hemorrhage.
7. Subperiosteal hemorrhage is frequently present.

May I say one word regarding halitosis, which is a very frequent symptom in adults, less so in children. Not a long time ago a patient came under my observation with a very foul breath, and no real reason for it was found. Postnasal catarrh and swollen tonsils were treated. It took some time to find the real reason, because the nurse gave calomel every few weeks to clean the stomach and bowels, or the liver, as she put it. Calomel as you know gives a very severe stomatitis in large doses and a most violent halitosis.

In conclusion, I wish to add a few words regarding the psychic reactions of a child to the dentist. The greatest difficulty in receiving cooperation from a child is experienced by the general dental practitioner, but orthodontists are confronted by behavior problems as well. All too frequently the real behavior case is due to one or both of the parents because the average child is subject to

all sorts of emotional outlets from thoughtless parents, and its formative mind undergoes a definite reaction to everything a parent says and does during its first few years. A few peculiarities of behavior may be inherited. I believe that only the tendency is inherited but that impressions received from the deeds of the parents influence a child's behavior almost from the time of birth. All of us who are members of the healing art and who deal with children must have the patience to analyze the causes for the peculiar behavior of unruly children and having once determined what these causes are must then try to overcome them. To accomplish this only two essentials are necessary—patience and tact.

I am indebted to Dr. Williams McKim Marriott of the Washington University School of Medicine, Dr. John M. Wheeler of the Medical Center and Dr. Charles Gottlieb for the loan of slides and for their manifold courtesies in preparing this paper, and to Dr. Robert M. Fischer for reading my manuscript and giving me many helpful suggestions.

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DISCUSSION

Dr. J. M. Lewis, New York City.—There is no doubt, as Dr. Fischer has emphasized, that closer cooperation should exist between the pediatrist and the orthodontist, because we pediatricians see cases of malocclusion in their very earliest stages, and then are in a position to recommend the child to the orthodontist to receive adequate and proper treatment. Unfortunately, though, many of us know little about malocclusion. Dr. Fischer emphasized various medical conditions in the mouth which should be recognized by the orthodontist. Conversely, pediatricians and physicians should be more informed about the various types of malocclusion. Medical students do not receive any instruction concerning disorders of dentition and orthodontia, and it might be worth while that a course in the various dental disorders be part of the medical curriculum so that we physicians might readily recognize them and thereby more closely cooperate with the dentist and the orthodontist.

Closer cooperation might be worth while too in carrying out investigations in regard to the causes of malocclusion. So far as I know, although there have been many factors

ascribed, their relative importance has not as yet been generally agreed upon in regard to malocclusion. Cooperation between physicians and dentists has existed in research concerning dental caries. You are all familiar with the interesting work that has been carried out in recent years by Boyd and Drain, Bunting, Mellanby, and Macbeth, among others. No specific etiologic factor has been found by these investigators to be responsible for the development of dental caries. However, a liberal diet, abundant in calcium, phosphorus and vitamin D, is more likely to prevent dental caries than is a diet poor in these calcifying ingredients. In spite of such a good diet, however, we know that dental caries may develop. I do not believe, as Hanke does, that vitamin C is of special importance in the etiology of dental caries, as it is well known that in Hawaii and in Jamaica, where the average diet contains a great deal of vitamin C, dental caries is a frequent disorder and, conversely, Eskimos, who live on a diet consisting mostly of blubber oil and fish (a diet poor in vitamin C), have excellent teeth and jaws.

We at the Infant Asylum have been particularly interested in the relationship of rickets to the development of dental caries. It is all well and good to show illustrations as to the effect of a rachitic diet on the teeth and jaws of rats; the question is whether we can transcribe our experiences in the rat to our experiences in the human being. It is necessary to follow up very closely children who have had such diseases as have been found to produce defective teeth and jaws in animals in order to see whether similar effects are noted in the human being. Accordingly, we followed up a group of children whom we knew to have had rickets during infancy and a group of children whom we knew not to have had rickets during infancy. These children have been observed in our institution for several years and during infancy examined monthly for signs and symptoms of rickets. Blood determinations for calcium and phosphorus were frequently carried out, as well as x-ray examination of the wrists. We found that the group that had rickets developed caries in deciduous teeth to a greater extent than the group that did not have rickets. On the other hand, so far as the first permanent molars were concerned, there was no difference at all as to the incidence of caries in both groups.

We were able by means of x-ray examination of the jaws of the newborn and of infants at various ages, i.e., three months, six months, nine months, and at a year, to correlate the aforementioned results with the time of calcification of the teeth. At birth, as Dr. Fischer mentioned, the first permanent molar is not calcified, a finding that is contrary to the teachings in most textbooks. Anatomic dissection in the jaws of the newborn also did not reveal any calcification of the first permanent molar. At about from three to six months of age, the first permanent molar begins to calcify, and at one year the occlusal surface is calcified. On the other hand, the first deciduous molars are slightly calcified at birth, and at six months of age the crowns are fairly well calcified. In view of the fact that rickets is a disorder which occurs in its highest incidence between three and nine months of age, at a time when rapid calcification is occurring in the first and second deciduous molars, it can be readily understood that since this disorder causes a depletion of calcium and phosphorus in the body, it might have some effect on the integrity of the first and second deciduous molars and no effect on the first permanent molars, which begin to be well calcified at a later age. It was also shown in this investigation that most of the calcification of the deciduous teeth occurs postnatally. It was found by chemical analysis that 20 per cent of the total calcification of the deciduous teeth is present at birth, so that the statement that pregnant mothers should receive liberal quantities of calcium and vitamin D in order that the teeth of the newborn may be well calcified is really greatly exaggerated.

Might I say a word in regard to the relationship of vitamin A to dental disorders. Dr. Fischer showed jaws of a group of animals on a vitamin A deficient diet, and it was noted that the teeth of these animals were carious and the jaws narrow. The question arises as to whether a lack of vitamin A in the human being has a similar effect on the structure of teeth and jaws. Bloch has observed more cases of children suffering from vitamin A deficiency than probably any one else has, and he was not able to find any defect in the teeth and jaws of these children. His report is very interesting in view of the recent communication by Wolbach and Howe, who showed that if a guinea pig (I believe it was) received a vitamin A deficient diet, defective enamel resulted.

In regard to malocclusion, as I stated at the beginning, we pediatricians know very little about this subject. We have not been taught what constitutes a mild, a moderate or a severe case, which types are more adaptable to early treatment and which cases do better with treatment later on in childhood. Closer cooperation between pediatricians and orthodontists would certainly be of mutual advantage.

Dr. Macbaith, New York City.—After listening to Dr. Fischer's paper, I feel that I am on familiar ground, and after listening to Dr. Lewis I feel much more that way. Part of my work at the Columbia Dental College is to educate the dental student, the future dental practitioner, to know the proper limits of his province. It is not to create enthusiasm nor does it mean that he shall lose his equilibrium and overstep the bounds. I do not want him to do that, and when we say we are "educating" the dentist, we mean we are attempting to make him more familiar with his own province. I see the need of a physician doing the same work with the medical student. It is not being done.

I think we are accomplishing a great deal. Some very valuable work was done by one of the medical students not long ago, and the striking correlation of the diet of these children with caries was brought out.

In looking over the paper, I find it was said that it was unfortunate that the physician did not recognize dental caries when he saw it. It does not give any reason for disagreement between the two professions.

Dr. Fischer has shown the incidence of rickets. We have not been able yet, as Dr. Lewis has said, too, to parallel the incidence or history of rickets with the incidence of dental caries. We have done a lot of research work and are still doing it at the Dental College, and we are finding that there is nutritional control of dental caries, but please be careful in referring to vitamin D. Do not say it will do this or that. Refer to it as the source of vitamins C and D. It may be that the combination does bring about some unknown factor that we do not know anything about.

I am trying to educate the dental student to keep his equilibrium when talking about nutrition in connection with dental caries.

In regard to vitamin D in irradiated milk, we find we are getting good results with vitamin D as isolated by Dr. Seiffer. It is the vitamin D of cod liver oil, not before isolated from vitamin A. Do not promiscuously prescribe vitamin D. Consult the pediatrist before you do that. I have had a number of telephone calls stating that the condition is such and such: "Should I prescribe viosterol?" Well, that is a long-distance diagnosis and rather difficult to make, and the dentist should consult the pediatrist before he makes these recommendations.

So many things have come up that I shall have to make just a few general statements. I only wish the dental students might attend a meeting like this and hear a paper like Dr. Fischer's. You practitioners know the need of this and how much more you should know about your own work, and the necessity of cooperating with the pediatrist. He worded it very well when he said, "The dentist is an unofficial lookout for the symptoms of disease." That is just what he is. He should know diseases, but before making the final diagnosis he should cooperate with the medical practitioner.

AN UNUSUAL INFANT DIET AND ITS QUESTIONABLE EFFECT UPON DENTITION*

R. C. Willett, D.M.D., Peoria, Ill.

PART I

IN PRESENT-DAY orthodontic discussion there seems to be no subject more alive than that of the effects of diet upon the teeth. If the general problem creates so much interest, the very unusual cases which I am presenting here ought to prove an incentive to lively arguments.

During the month of December, 1932, the case of Mark M. was brought to our attention through the Child Welfare League. Mark was then six years and ten months old, and was making the most of opportunities afforded him in an orphanage home and in regular attendance at a neighboring public school. The condition of his teeth and the little that was known concerning his life history had attracted the attention of public school nurses, the school dentist, and social workers.

Since we did not wish to make a recorded examination of Mark's case, depending upon hearsay information, the mother was located, sent for, and interviewed. She stated that Mark had been born January 30, 1926. He was an over-time child by almost two weeks.

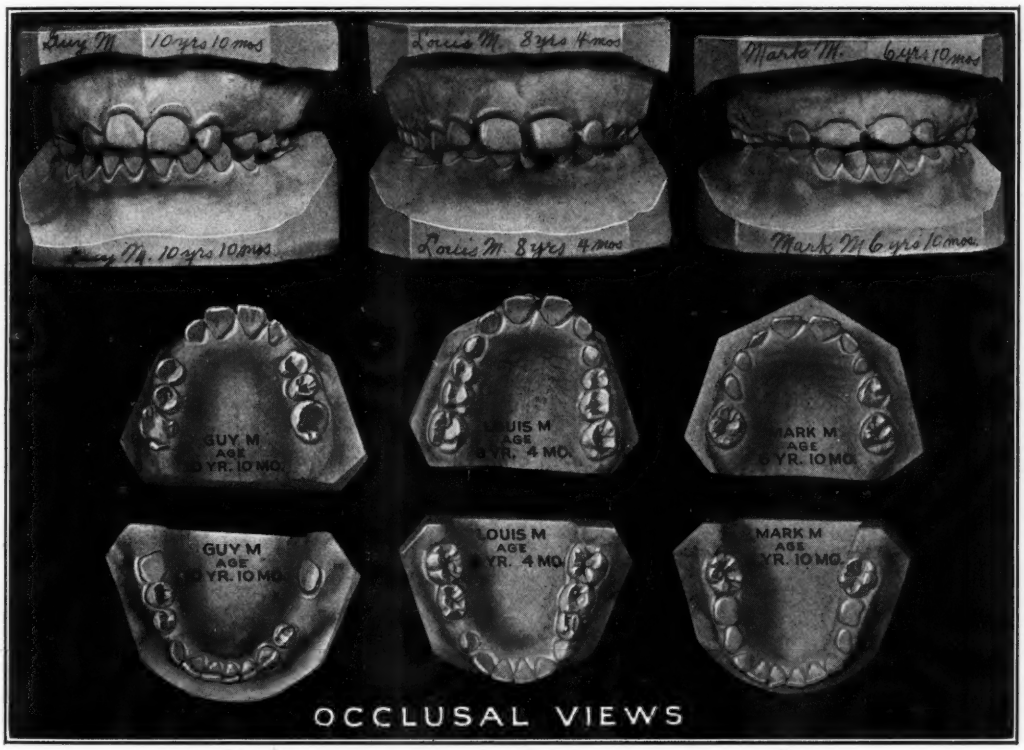
His weight at birth was ten and a half pounds, and, so far as the mother knew, the child was born normal in every respect. After nursing from her breast for a period of five days, the child began to fail. The mother changed from breast feeding to a diet of buttermilk and Karo syrup. This change of diet did not agree with the child, and Eagle Brand milk was tried with no better results. Horlick's malted milk was then substituted, but ill health and loss of weight continued. The malted milk diet was therefore dropped, and a preparation of oats and barley water was tried.

At this time Mark had survived his fifth month and seventeenth day. He was still losing weight, and the services of the city hospital were sought. An investigation of the hospital records showed that Mark M. was admitted July 15, 1926. The diagnosis was intestinal fermentation and chronic bronchitis. A physical examination revealed that the child was undernourished and presented difficulty in breathing. Mucous râles were very marked. The hospital records showed that eleven days later, July 26, the child was apparently in good condition and gaining in weight. He was therefore taken back to the tenement home, but at once began to lose weight, and continued to do so until he weighed only ten pounds—one-half pound less than at birth.

*Presented at the Thirty-Second Annual Meeting of the American Society of Orthodontists, Oklahoma City, Okla., November 8-10, 1933.

The mother's account and the hospital records indicate that Mark must have been entering upon his seventh month when a Polish woman suggested giving him home brew. The beverage was first given in a teaspoon at regular intervals, and then fed out of a nursing bottle. The child liked the home brew and, according to the mother's story, thrived upon it. No milk or any other food was given for at least three months.

During the four months following the adoption of this diet, Mark's gain in weight, as reported to us, was about eight pounds. We were able, in a way, to verify the period of time that the child was nourished on the home brew by questioning the mother in regard to the weather at that season. She informed us that the weather was very hot, and that in the third floor tenement



A *B* *C*

Fig. 1.

it had been hard to keep the liquid cool enough to prevent the nipple from blowing off the nursing bottle. This kept the baby's clothing soaked with home brew, so that the odor arising from him was that of stale beer. As a result of that questioning it was evident that the youngster was something of a soak inside and out.

From further checking of the story, it seems that the mother started supplementary feeding of cereals, soup, gravy, and jello at about the tenth or eleventh month. Inquiry was made as to the amount of milk used, and we were told that the daily allowance was one quart for five children.

Mark's teeth began erupting about the eighth month and, when they appeared, were devoid of enamel. His general health seems to have been estab-

lished, for he was not ill again until his fifth year. This illness seems to have been principally due to a throat infection and obstructive adenoids. The tonsils and adenoids were removed, and Mark seems to have enjoyed the best of health ever since.

The remaining deciduous molars and canines confirm the previous history told by the mother. (Fig. 1 *C*.) There is no evidence of enamel, nor is there evidence that the teeth were ever affected by dental caries. The remaining nine deciduous teeth are well worn down and have the appearance of highly

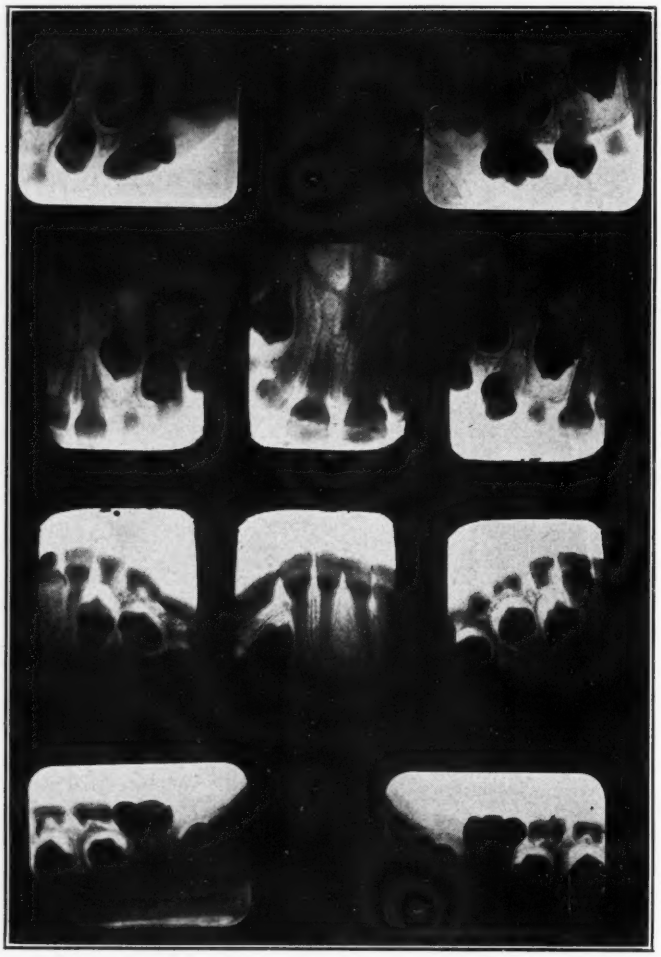


Fig. 2.—Mark M., aged six years and ten months.

polished old ivory. The enamel of the thirteen permanent teeth that have erupted is a bluish gray color, somewhat corrugated, but sound in texture. They cannot be classed as hyperplastic enamel teeth. They are not pitted. While the occlusion is far from ideal, the teeth function well, and there is no serious malformation of the dental arches.

Fig. 2 shows radiograms of the maxillary and mandibular teeth.

Fig. 3 *C* shows radiogram of the right hand, shown as a specimen of the child's skeletal development.

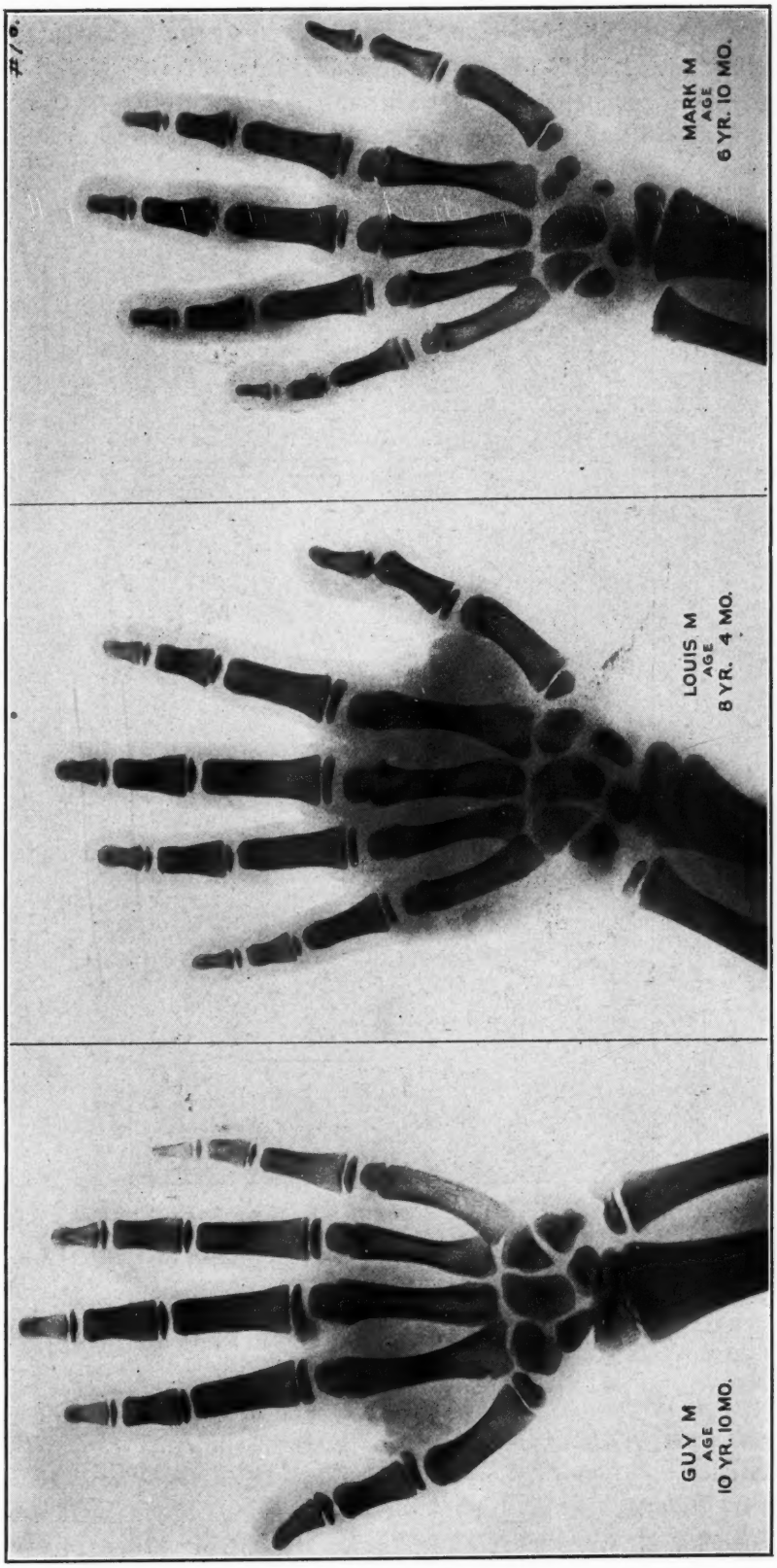

#10.
GUY M
AGE
10 YR. 10 MO.
LOUIS M
AGE
8 YR. 4 MO.
MARK M
AGE
6 YR. 10 MO.
A
B
C

Fig. 3.

Fig. 4 *C* shows front view and profile photographs of the boy.

The regular Kahn tests were made and proved negative, thus ruling out a history of lues so far as can be determined by such a test. The character of this boy's tooth structure, moreover, cannot be attributed to water. He has never resided in a locality where children's teeth are affected in such a way.

Fig. 4.—*A*, Guy M., aged ten years and ten months; *B*, Louis M., aged eight years and four months; *C*, Mark M., aged six years and ten months.

The open question is, What effect did this boy's unusual early diet have upon dentition, and how are we to account for as satisfactory a condition of the dental structures as exists at this time?

PART II

A detailed account of the family history as far as it could be traced and authenticated follows:

Mr. and Mrs. M. were married in 1918. Mrs. M. was then fourteen years of age, and Mr. M. was twenty.

Their first child, Mae, was born July 27, 1919, during the mother's fifteenth year. The delivery had to be made by instruments, but otherwise was normal as far as could be confirmed. Mae was breast fed. The teeth began erupting at the age of about six months. The present condition of her mouth indicates that the deciduous teeth must have been of good structure, must have functioned well, and were not seriously affected by caries. At the age of eleven years, several permanent molars were filled, and the mandibular left first permanent molar was extracted. Now, at the age of thirteen years, Mae is the picture of good health. Her school report shows that she apparently has an average mentality.

Ann, the second child, was born December 4, 1920. The delivery was again instrumental. The conditions as to dentition and caries have been about

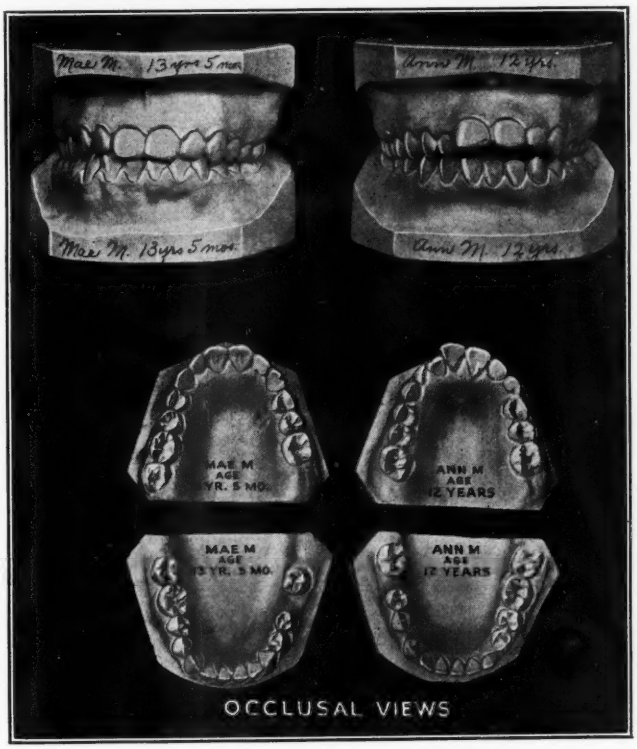


Fig. 5.

the same as those of the preceding child, Mae, except that Ann was, and still is, a persistent thumb-sucker. Her mentality is below average.

Fig. 5 shows casts made in December, 1932, showing the arch development and the occlusion of the teeth in the cases of Mae, then aged thirteen years and ten months, and Ann, twelve years old.

Guy, the third child, was born January 28, 1922, by an instrumental delivery. He was a full-time, normal child, and weighed nine and three-fourths pounds at birth. After being breast fed for one month, he was changed to a bottle feeding of Eagle Brand milk, with supplementary feeding of lime water and orange juice. At about the sixth month Guy's diet was again changed to lactic acid milk and Karo syrup. The deciduous teeth started to erupt between

the fourth and fifth month. When they appeared, they were devoid of enamel. It is evident from the history secured and from the present condition of Guy's teeth, that they were not affected by caries. In general character, they were much the same as Mark's teeth.

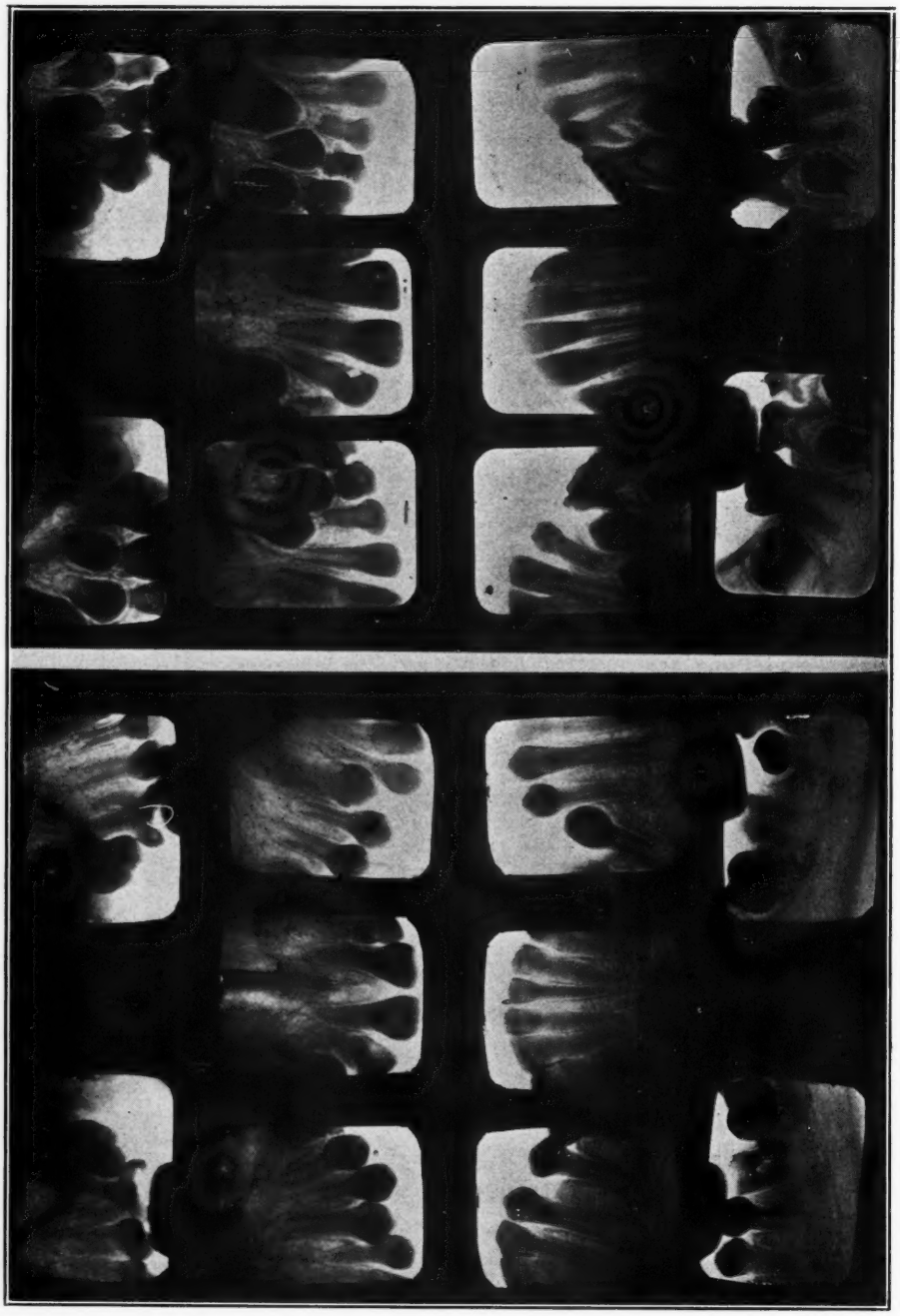


Fig. 7.—Louis M., aged eight years and four months.

Fig. 6.—Guy M., aged ten years and ten months.

The permanent teeth, however, show some interesting developments. The crowns of the mandibular first permanent molars seem to have dissolved away and have no occlusal contact with the first permanent molars of the opposing arch. The color of these two teeth is the same as that of the remaining deciduous teeth in Mark's case—the color of old ivory—a dark yellow. Guy's

maxillary first permanent molars have some enamel walls remaining, but the occlusal surfaces are cupped out, and the dentin is a light yellow color. The seventeen other permanent teeth are normal in structure and form. As in the case of Mark, the teeth are devoid of caries.

William Henry, the fourth child, died at the age of four months from intestinal fermentation.

Louis, the fifth child, was born September 17, 1924. This boy resembles his sister Ann; he is of lower mentality, and now at the age of eight years persists in sucking his thumb. Dentition is much the same as that of the sisters except as to the color of the teeth. They are bluish gray, and the mandibular incisors are somewhat translucent. They appear to be all enamel, and in radiograms taken in that region did not show distinctly as the other teeth did under the same time exposure to the x-ray.

Fig. 1 shows the arch form and occlusion in the cases of Guy, Louis, and Mark.

Fig. 4 is a group picture showing profile and front views of Guy, Louis, and Mark.

In Fig. 6 the radiograms show the state of dentition in the case of Guy.

The radiograms in Fig. 7 show the state of dentition in the case of Louis.

In Fig. 3 the radiograms are of the right hand, showing the comparative skeletal development in Guy, Louis, and Mark.

The intelligence test of the five children revealed the following:

Mae.—Stanford-Binet test. Mental age eleven years seven months; chronological age thirteen years seven months. Intelligence quotient 85 per cent. Dull, but not feebleminded. (See Mark.)

Ann.—Stanford-Binet test. Mental age nine years three months; chronological age twelve years three months. Intelligence quotient 75 per cent. This shows borderline deficiency. She is probably feebleminded, as base line is in eight years with considerable scattering. She need not be institutionalized unless a social problem. Twelve years is about the highest mental age to which she can be expected to attain.

Guy.—Stanford-Binet test. Mental age ten years; chronological age eleven years one month. Intelligence quotient 90 per cent. Dull, but not feebleminded. (See Mark.)

Louis.—Stanford-Binet test. Mental age seven years; chronological age eight years five months. Intelligence quotient 85 per cent. Dull, but not feebleminded. (See Mark.)

Mark.—Stanford-Binet test. Mental age six years two months; chronological age seven years one month. Intelligence quotient 87 per cent. Dull, but not feebleminded; a mental age of fourteen years is about the highest level he will attain. He will be able to reach eighth grade, but one to three failures on the way may be expected. The above tests were made by Helen Coyle, M.D., City Psychologist, on March 1, 1933.

We shall now review the early family history relating to the teeth on the paternal side of the family. The history of the maternal ancestors was not available, as the mother of the children was an adopted child, and the foster parents could not give a definite history of her or her family.

The paternal great-grandfather, who was of German nationality, had sound teeth, so far as is known. The great-grandmother, however, who was French, had teeth without enamel. The teeth of their daughter, the grandmother, had the same characteristic, as did those of one of her brothers. In a personal interview with the grandmother, she said that her son, the father of the children, had no enamel on his first teeth nor on the permanent ones. The father, when interviewed, stated that his teeth did not decay, and that he had no gingival disease. The teeth, however, wore down to the gums; and believing that artificial teeth would serve him better and improve his appearance, he went to a dental school infirmary and had them all extracted when he was only twenty-seven years old. Except for one third molar, all of them proved to have very short roots.

The Kahn test for syphilis has proved negative on the father, mother, and all their children.

I decline to offer an opinion as to the extent to which diet or heredity may have been responsible for the deviations from norm found in the examination of the children's teeth. I leave the whole matter to the able members of the Society who have been chosen to enter the discussion and to any others who may wish to take part in it.

DISCUSSION

(Dr. Robison and Dr. Lewis discussed Part I; Dr. Bodecker and Dr. Hoffman discussed the article as a whole.)

Dr. Homer B. Robison, Hutchinson, Kansas.—I am in perfect agreement with Dr. Willett. This child did have an unusual diet. At first thought, it would seem impossible that home brew, especially some that I have tasted, could have such nourishing and medicinal properties as this case would indicate.

It is a known fact that vitamin B is an aid to digestion through the active ferment that is present. This ferment is also found in sauerkraut, buttermilk, odoriferous cheese, ensilage, yeast, etc. In correspondence with G. S. Bratton, director of Laboratories of Anheuser-Busch, Inc., in regard to vitamin B, he states: "In reference to the amount of vitamin B contained in beer, we wish to advise that clearly filtered beer has very little vitamin B left in it. During fermentation and aging of beer the yeast absorbs out of the beer most of the vitamin B. It is possible that draught beer might contain slightly more vitamin B than bottle beer, in view of the fact that it is not pasteurized and some yeast remains in it. Draught beer is apparently more pleasing to drink on account of the lack of the pasteurization taste, which is slightly noticeable in bottled beer. Being more agreeable, it is possible that draught beer may be more palatable. However, by chemical analysis, the two may be identical." The fact that home brew is not so highly filtered and aged may have been especially favorable in this particular case due to its retaining a larger amount of vitamin B. Engelbach states: "Cramer, Drew and Mottram have shown that thymic atrophy follows a lack of vitamin B, but that regeneration takes place again when it is supplied."

SaJous states: "The function of the thymus is to supply, through the agency of its lymphocytes, the excess of phosphorus in organic combination which the body, particularly the osseous, nervous, and genital systems, requires during its development and growth, i.e., during infancy, childhood, and adolescence or later if need be."

I might state here that there are some in disagreement with this statement, but I have not yet found any one who has disproved it. They have discredited, but have not been able to disprove it.

Klose and Vogt, after thymectomy on dogs found a softening of bone. Basch found in these cases an elimination of calcium. In other words, when the thymus is removed, there will be elimination of calcium, supposedly because they must work in correlation one with the other. If the phosphorus cannot be used, the calcium is eliminated also, and that is why there is demineralization of the bone in these instances. Now it is possible that vitamin B through its faculties as an intestinal regulator aids in producing a normal calcium absorption.

It is a well-known fact that the parathyroids have to do with calcification. Bergeim has demonstrated that calcium is absorbed into the blood from the small intestines, and most rapidly when phosphoric absorption is high. Roe and Kahn substantiate his findings. Engelbach states: "Parathyroidectomy may decrease the blood calcium by 40 to 50 per cent. Dragstedt (1927) found the dentin, enamel, and bone deposited in young experimental animals to contain less calcium than the controls that were not parathyroidectomized."

These authorities have quite well proved the necessity of a correlated action of the thymus and parathyroid glands which are a positive factor in the assimilation of phosphorus and calcium. So much for the possible glandular involvement.

Now as to the nourishing elements in beer (Taken from reprint from *Journal of American Medical Association*): "Beer differs considerably in composition. The following figures are representative for seven types of beer, the averages of about 600 analyses being used.

"Beer may be expected to contain, in addition to its alcohol content, from 5 to 7 per cent of solid matter or extract; from 0.5 to 0.7 per cent of nitrogenous substances, some of which are protein; from 1 to 2.5 per cent of sugar as maltose; from 2 to 4 per cent of gums and dextrins; from 0.16 to 0.4 per cent of acid as lactic acid, and from 0.15 to 0.36 per cent of ash. Fat, as such, may be considered absent.

"A pint of beer will provide approximately 250 calories. These calories are derived from the chief ingredients as follows: protein or organic nitrogen compounds, 12 calories; carbohydrates, 70; organic acids, 6; and alcohol, 108."

Its value in lactation both in starting the flow of milk and in increasing the amount is well established, probably from the stimulating effect of alcohol on the periphery of the muscles. There are but few women who cannot nurse babies satisfactorily when using beer.

I have attempted to point out briefly how a correlated action of the various elements of home brew might have had a part in the correction of this deficiency, and how a lack of these may have retarded the function of the various glands which in turn caused a lack of mineral deposition, hence the lack of enamel and retarded skeletal growth; however, it is impossible to cover this subject thoroughly in so short a time.

Dr. Samuel J. Lewis, Detroit, Mich.—In this present case Dr. Willett asks: "What effect did this boy's unusual diet have upon dentition, and how are we to account for as satisfactory a condition of the dental structures as exists at this time?" Well, I pondered over the question for hours, got out my histology, and then called a meeting of the nutrition staff of the Merrill-Palmer School.

First of all we decided that this paper ought to be read before the W. C. T. U. as an argument for the return of beer. Certainly this brew served both as food and as drink, an old argument used by brewers.

Now as to the question, "What effect did this diet have on the dentition?" An analysis of the brew mixture shows it to be a source of water, sugar, and vitamins B and G. It is also known that the cells of the child's structure store up water very easily. The gain in weight is perhaps due to water retention. As the child gained while in the hospital, though Dr. Willett does not say what food was given, it must have stored up some material which the body used in the three months' period of home brew feeding. This was from the seventh month to the tenth, when supplementary feeding was instituted. From then on the child gained and appeared quite normal. Certainly this brew mixture was an inadequate food, and the only way in which one can account for the gain in weight is, as I said, the retention of water in the cells.

Now as to the teeth, the crowns of the deciduous teeth start to calcify from the fourth to the sixth month of fetal life. The crowns are completely calcified from the twelfth to the twenty-fourth month after birth. Hence, any metabolic disturbance between the fourth fetal month, and the second year after birth might disturb the enamel formation of the deciduous teeth. There is no record of the mother's diet during pregnancy, but it is quite possible that the calcium element was lacking in sufficient amounts to take care of both mother and child. As a rule, the child does not suffer from an inadequate amount of calcium and phosphorus in the mother's diet; the mother does. But, it may happen, according to McCollum's findings, that both mother and child will suffer, so far as the teeth and bones are concerned. In this case the child has surely suffered as is evidenced by the teeth, both deciduous and permanent. I was not able to appraise the roentgenogram of the hand, as I saw only the print. According to our Merrill-Palmer standards it looks like the hand of a normal seven-year-old child. However, there may be certain evidence in the roentgenogram to preclude this. We certainly are finding many scars on the bones in our own material where formerly we thought them to be normal.

I do not know how to account for the present, as Dr. Willett puts it, satisfactory condition of the child, but I do know that we often find in our Merrill-Palmer children attempts on the part of nature to right a wrong as a result of some early misadventure. Perhaps nature was kind to this child after the tenth month.

This is surely a very interesting case, and in my opinion illustrates the effect of nutrition on the teeth and dental structures. However, the question that Dr. Willett propounds is still an open one.

Dr. Charles F. Bodecker, New York, N. Y. (Read by Dr. Eby.)—Dr. Willett certainly makes the point clear that diet is not the cause of faulty development in 100 per cent of cases.

Heredity is a major factor in transmitting organic disturbances to future generations. In the case under discussion it is evident that an epithelial disturbance which interfered with the proper enamel development was transmitted to some of the children by the great-great-grandmother. The fact that other children of the same marriage as Mark showed deficient enamel formation indicates that the home brew was not the cause of the disturbance.

Nevertheless, I do not suggest replacing milk and the semisolid diet given to children today, with home brew.

Dr. Henry F. Hoffman, Denver.—Dr. Willett has gone into this extremely interesting report in his usual energetic and thorough manner, leaving no bit of evidence unaccounted for which could possibly be secured. One cannot help marveling that he could collect so much data from such sources.

The report in its two parts supplemented by the I.Q. test of the five children opens a very broad field for discussion. We should note that the author's scientific mind declines to be led into the byways of imagination. Adhering strictly to the facts presented, he generously leaves all speculation to the discussors.

Without more data concerning the family dietary, no information having been given beyond the single item "home brew," if that can properly be called an article of diet, it would be ridiculous to attempt an analysis of the nutritional factors underlying the general absence of caries, the failure in the development of enamel, and the seeming normal development of osseous structure.

We may, however, properly review the facts actually at our command.

Any one desiring to attempt such a feat as explaining the general immunity to caries should first read the recent papers by Bunting and Bodecker, both published in the May, 1933, issue of the J. A. D. A. These give an accurate digest of our present knowledge of immunity to caries from which it appears that we have very little definite knowledge of the processes controlling immunity. It is generally accepted, however, that diet and prophylaxis are the most important factors now at our command, with diet ranking first in importance, and further, that no "single article" of diet appears to be the determining factor but that a "well-balanced" diet is believed to produce the best results.

We are still at sea as to just what constitutes a balanced diet. We have no accepted standard. The meaning of the term is often quite vague in people's minds, and it may be regarded as applying to anything from the selection of food combinations with reference to caloric values and final acid alkaline end-products to an acrobatic feat.

The question may be asked, why should the malnutrition from which we must believe these children suffered when young be indicated so definitely in the failure to develop good enamel and in some instances any enamel at all, while the skeletal structure developed so well? I repeat, "while the skeletal structure developed so well." Probably it was not "while" but "subsequent to" the period for the development of enamel that good skeletal structure was developed. At some time these children must have had satisfactory nutrition for the development of bone and the promotion of immunity to caries.

Then we cannot overlook the influence of heredity upon the development of teeth and bones. We can credit almost everything about our teeth to heredity: The shape and size, thickness of enamel, special peculiarities, color, congenital absence, etc. Why cannot a failure to develop *any* enamel be inherited? If any credence can be put in this family history, there is evidence of a tendency to the absence of enamel through three generations. In any case the evidence at hand is insufficient to prove heredity or environment as the causative factor.

At the risk of being classed as antediluvian, I confess to still believing in heredity as the factor with which we have most frequently to deal. For the perpetuation of the species, the parents must still be counted as among those present. We have still to consider that spark of life which determines the destiny of every living cell.

I can see no evidence of endocrine disturbance within the range of our present knowledge of the subject.

If, in these cases, we accept the absence and poor development of enamel as due to malnutrition, these findings do not harmonize with the theories of recent investigators crediting malocclusion to faulty osseous structure due to malnutrition; for, if the theories of these investigators are correct, a malnutrition of sufficient duration and seriousness to produce such enamel lesions as are present in the teeth of these children, should also cause a sufficiently undeveloped osseous structure to produce malocclusion.

Naturally one's first question should be, What could be expected nutritionally or otherwise of the only article of diet referred to, namely, home brew?

This was a poor family living in a tenement house district. The children were born and reared under usual tenement house conditions of that time—no refrigeration or other adequate sanitary protection for food.

The hospital diagnosis "intestinal fermentation" given in the case of Mark and in that of the fourth child, William, who died at the age of four months, bears out this theory.

For practical purposes home brew may be regarded as a mixture of beer and yeast. Yeast is known as one of the richest sources of vitamin B, the antineurotic and appetite producing vitamin. Any benefit derived from the home brew is easily traceable to the vitamin B content and to the control of intestinal fermentation through a change in the intestinal flora.

The next question should be, "What is the food value of beer?" Harden and Silva, *Journal of Biochemistry*, 1924, have found that beer is free from both B and C vitamins. Lusk in *Science and Nutrition* calls attention to the experiments of Atwater and Benedict showing that substitution of carbohydrates with isodynamic quantities of alcohol resulted in no change in the calories of metabolism. These experiments, of course, were conducted with sustaining diets. In a report of a research conducted by John Smith Sharpe, entitled "The Distribution of Nitrogen in Beer," *Journal of Biochemistry*, 1917, the author draws the conclusion, "The protein content of beer is not appreciable when it reaches the consumer."

This report was regarded as of sufficient importance to be made the subject of a lengthy editorial in the *Lancet*, September 15, 1917, in which, after reviewing the researches of Sharpe, the following conclusion is made, "It is fallacious, once and for all, to justify its (speaking of beer) consumption on the clut of calories or 'tissue formers.' There is, however, one point overlooked in regard to the rôle of beer in the dietary. It contains a material amount of diet deficiency substances of the order of vitamins."

The I.Q. report of the five children crediting all of them with being dull is extremely interesting and offers perhaps more definite grounds for drawing conclusions than any point brought out in the essay inasmuch as Dr. Willett has stated in subsequent correspondence that all the children were given home brew as freely as they wished to take it. A report by T. A. Macnichol, Vice-President, A. M. A., for the study of alcohol and inebriety, entitled "A Medical Study of the Effects of Alcohol on School Children," *New England Medical Monthly*, August, 1905, brings to light some very interesting information. We do not know what the habits of the parents of these children were, but the findings of Macnichol show clearly that hereditary influence upon children from the effects of alcohol is much the same as is the effect of its habitual consumption by growing children. (When I began the preparation of this discussion nothing could have been farther from my thoughts than the preparation of a temperance lecture, but the material which came to hand was of such a startling nature that I am impelled to give it to you.) I should like, therefore, to quote in part from this report:

"In a study of the relation of heredity to the mental deficiency of children, undertaken in 1901 for the New York Academy of Medicine, I was forcibly impressed with the conspicuous position occupied by alcohol. A more extensive study verifies the facts then presented and gives added emphasis to alcohol as an etiologic factor in mental deficiency.

"This subsequent investigation included 55,000 school children who, classified according to their standing in studies, appear as follows: standard, 42 per cent; below standard, 16 per cent; dullards, 17 per cent; very deficient, 25 per cent. Direct causes of dullness reported: personal habits, 9 per cent; environment, 11 per cent; heredity, 65 per cent; sickness, less than 1/300 of 1 per cent.

"All things being equal, the children of the native present no superiority over those of the foreigner. As an instance: A class of 50, in which 90 per cent of the children had an American ancestry of five generations, but with hereditary alcoholic taint, reported 80 per cent dullards.

"The parental attitude to alcoholic drinks is reported in 20,147 cases: children of drinking parents, 6,624, 53 per cent being dullards; children of abstaining parents, 13,423, 10 per cent being dullards.

"The following is a summary of the family histories of 3,711 children of 1,100 different families traced through three generations:

"Of the children of drinking parents but abstaining grandparents, 77 per cent were dullards, of the children of abstaining parents and abstaining grandparents, 4 per cent were dullards. Dividing the 3,711 children into two classes, viz., those free from alcoholic taint and those with alcoholic taint, we note some very striking contrasts:

"1. Those free from alcoholic taint: 96 per cent were proficient, 4 per cent were dullards, 18 per cent suffered from some neurosis or organic disease.

"2. Those with hereditary alcoholic taint: 23 per cent were proficient, 77 per cent were dullards, 30 per cent very deficient, 76 per cent suffered from some neurosis or organic disease

"The close correspondence between the drinking habits of the parent and the mental deficiency of the child cannot be the result of mere accident.

"One causative factor of dullness which should command close attention is the prevailing drinking habit among children. A few special instances may be noted: Four classes, having a total of 184 pupils ranging from eight to eleven years of age, were reported as 'unusually dull,' but 16 reaching the standard in study. Investigation revealed the following facts: 160 drinkers (about 87 per cent), 57 of whom drank 'liquors' regularly with their meals."

To me this appeared to be a very complicated essay to digest on first reading, and I doubt the ability of many, especially alcoholics, to grasp fully all the questions raised and the import thereof without a careful perusal.

Please accept my apologies for this shotgun dose, but remember that the essayist presented us with the shotgun, loaded and cocked.

FACIAL AND DENTAL DEFORMITIES DUE TO PERENNIAL NASAL ALLERGY IN CHILDHOOD*†

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IN THE study of children and adults who have suffered from perennial nasal allergy during early childhood, we have observed that many have paranasal depressions which give the nose undue prominence. We have also been impressed with the frequency of excessive overriding maxillary incisors and the V-shaped

Fig. 1.—Nose rubber. This patient is sensitive to milk. Note the upward stroke.

palate. That facial deformity is common in children and adults who have suffered from nasal allergy is plainly evident to us. The existence of such deformity was first pointed out by Duke.[1] However, he did not mention the common occurrence of dental and palate deformities in these cases. The apparent unusual frequency of facial deformity, protruding maxillary incisors and a Gothic arch in these patients has encouraged us to study a series of

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†Read at the Thirty-Second Annual Meeting of the American Society of Orthodontists, Oklahoma City, Okla., Nov. 8-10, 1933.

children suffering from perennial nasal allergy, with special reference to such pathologic conditions as a probable causative factor in the dental and palate deformities, as well as the facial deformity.

For many years we have observed that chronic asthma in childhood frequently causes gross deformities of the chest. The degree of the deformity depends largely on the age at onset, severity and frequency of attacks, general nutrition and stature of the child. The slender child who has chronic asthma early in life, and continues to suffer, nearly always develops deformity of the chest to some degree. Such deformity is seldom found in children with seasonal asthma. Many asthmatic children also have chronic congestion of the

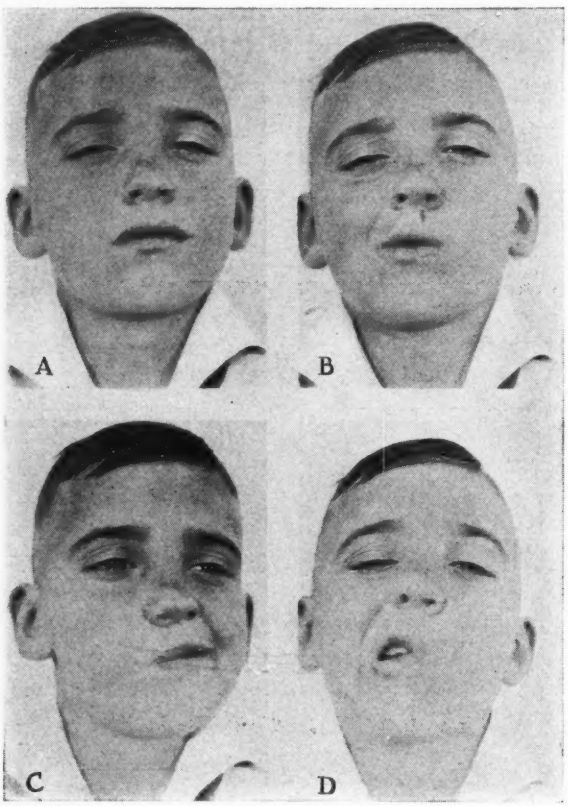

Fig. 2.—A patient (same as shown in Fig. 1) with perennial nasal allergy due to milk sensitivity. In *A* note paranasal depression and lack of prominence of the cheek; *B* demonstrates wrinkling of the nose; and *C* and *D* demonstrate mouth maneuvers as means of easing the uncomfortable itching of the mucous membrane.

nose, commonly known as "catarrh," perennial hay fever, or vasomotor rhinitis; a better term, we feel, is that of chronic nasal allergy. The nasal symptoms often occur during the first few months of life. There are many children who have perennial nasal allergy who do not suffer from asthma. The child with nasal allergy alone, or such pathologic condition associated with asthma, often becomes a "nose rubber" or a "nose wrinkler" or both.

SIGNIFICANCE OF NOSE RUBBING AND NOSE WRINKLING IN CHILDREN

We have noted that almost all children with chronic nasal allergy develop the habit of rubbing the nose. It is done with a side to side, rotary, or up-

ward stroke, the latter being the most common. They are trying to ease an uncomfortable itching of the mucous membrane of the nose which is present a great deal of the time. If such a habit begins early in life and continues over a period of years, a distorted nose is often the result.

When it is not convenient for a child who suffers from an itching nose to use his hand to relieve the symptom, he attempts to overcome the discomfort by wrinkling his nose or twisting his mouth, as shown in Fig. 2.

There might be conditions other than nasal allergy that would cause children to develop nose wrinkling, but it is probably the cause of the majority of these cases. Children suffering from seasonal hay fever often have intense itching of the eyes, nose and throat, and seek relief by rubbing the eyes and nose with the hand and also by scratching the palate with the tongue. Since the period of suffering in seasonal hay fever is of comparatively short

Fig. 3.—Deformity of the nose in a child, due to frequent rubbing with an upward stroke. Shape of the nose is not inherited. Compare the shape of the nose with that of both the father and the mother.

duration, no ill effects result in the form of facial, dental, palate deformities. Nose rubbing and wrinkling might be considered a pathognomonic sign of nasal allergy.

FACIAL DEFORMITY

The child who suffers from chronically swollen turbinates due to allergy usually has a congestion of the mucous membrane of the paranasal sinuses, and the openings from the nose into the sinuses are partially or totally blocked with mucus or swollen tissue a great deal of the time. Such a condition would naturally interfere with the normal aeration of the sinuses. It is reasonable to assume that the pathologic condition mentioned would seriously hinder normal development. Dr. Wasson,[2] of the Child Research Clinic in Denver, made roentgenograms of a series of children every four months from

Fig. 4.—Roentgenograms of allergic sinuses. Note cloudiness of the antrums, sphenoids and ethmoids in the plates shown above. Compare the sinuses with those shown in the two lower plates. Change is due entirely to allergic management. (Courtesy of Dr. C. H. Heacock.)

Fig. 5.

Fig. 6.

Fig. 5.—A boy, aged twelve years, suffering since infancy from perennial nasal allergy due to food. Note the depression of the nasal process of the maxillary bone.

Fig. 6.—A young adult who has suffered from nasal allergy since one year of age. Nasal symptoms due to sensitization to animal emanations and food. Note the depression at the side of the nose, giving undue prominence to the nose. This boy has a Gothic arch and excessive overriding of the maxillary incisors.

birth on through the age of sinus development. He found that those who suffered from a chronic congestion of the nasal and sinus mucous membrane had small undeveloped ethmoids, sphenoids, and antrums. Undeveloped ethmoids and sphenoids should cause a depression at the sides of the nose. Diminutive antrums should allow a depression of the nasal processes of the maxillary bones. Such depressions would give prominence to the nose and lack of prominence to the cheek, causing facial deformity. Clinical observations show that such facial deformities actually occur in children and adults who have had chronic nasal allergy. The facial deformity is excellent clinical evidence of diminutive ethmoids, sphenoids, and antrums.

DENTAL AND PALATE DEFORMITIES

The dental and palate deformities in which we are primarily interested are the excessive overriding of the maxillary incisors and the V-shaped palate. In

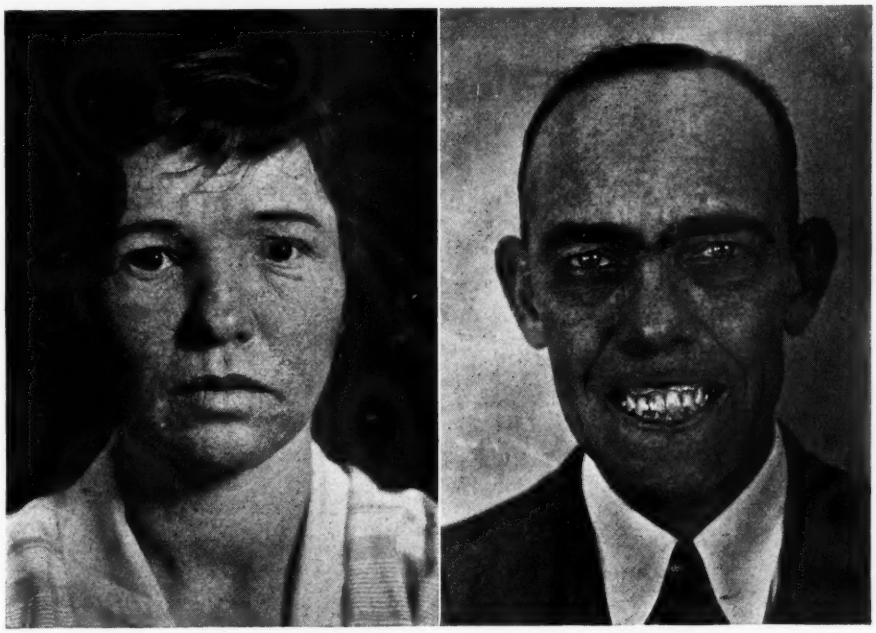

Fig. 7. Fig. 8.

Fig. 7.—An adult, with nasal allergy since a small child, due to wheat sensitivity. Note the prominent nose, paranasal depression, and lack of prominence of the cheek.

Fig. 8.—An adult with nasal allergy since childhood, sensitive to inhalants and food. Note facial deformity and excessive overriding of the maxillary incisors.

describing facial deformity in patients suffering from chronic nasal allergy, Duke[1] states: "This type of face differs from that caused by adenoids in the absence of the pinched appearance of the nose, in the lack of prominence of the upper incisor teeth and in the absence of the abnormal mouth and abnormal lower jaw." Our study of the chronic nasal allergy in children has given us information which is indeed at variance with his findings. We agree with him that most of the patients we have observed suffering from chronic nasal allergy since early childhood have evidence, either by roentgenogram findings or by facial appearance, of poorly developed paranasal sinuses. How-

ever, many of them with facial deformities which are typical of those described by Duke have excessive overriding maxillary incisors and a Gothic arch.

Meyer[3] of Copenhagen, in 1868, and Tomes[4] of England, four years later, suggested mouth-breathing secondary to adenoids as a cause of the palate and dental deformity we have mentioned. This view was generally accepted until

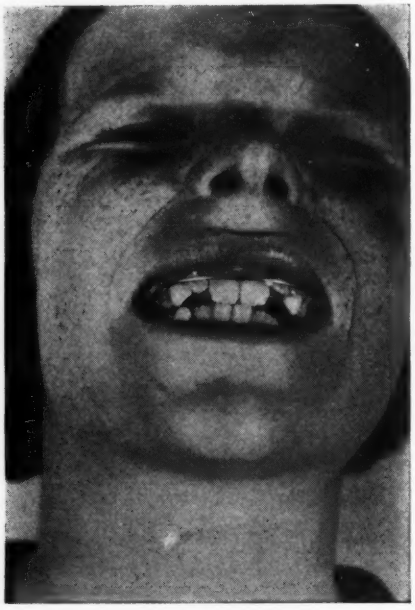

Fig. 9.

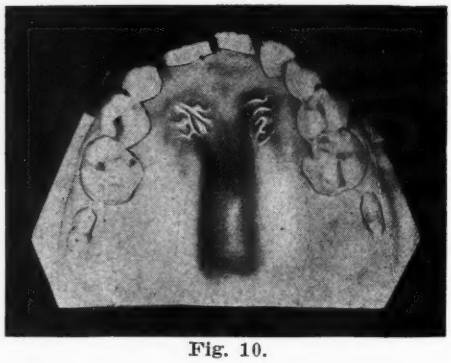

Fig. 10.

Fig. 9.—Nasal allergy since infancy. Tonsils and adenoids removed at two years, without relief of nasal symptoms. Wet nose due to wheat sensitization. There has been marked overriding of maxillary incisors. Correction is now being made.

Fig. 10.—Cast of mouth of same patient as shown in Fig. 9. Note V-shaped palate.

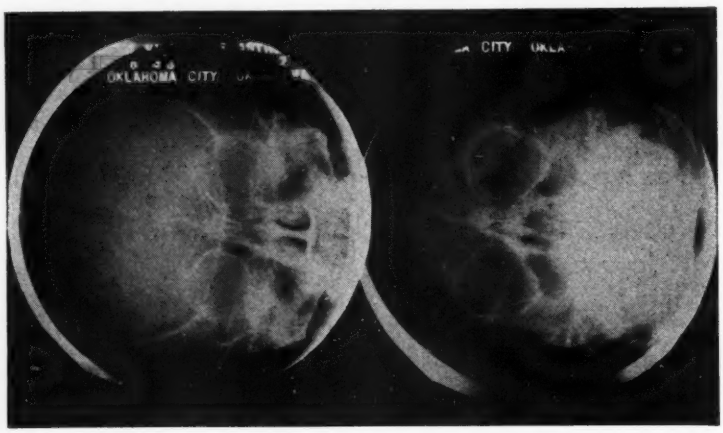

Fig. 11.—Roentgenograms of sphenoids, ethmoids, antrums and frontal sinuses of patient shown in Figs. 9 and 10. Note the poorly developed paranasal sinuses. Patient is eleven years old.

about ten years ago. However, as early as 1879, Kingsley[5] bitterly opposed such a view, and there has not been lack of opposition since. Much has been written and still is being written pro and con, both in England and in this country, concerning adenoids as a causative factor in palate and dental de-

formities. McKenzie,[6] in 1908, studied 222 children suffering from adenoids and concluded that the presence of adenoids does not interfere with the normal development of the jaw and palate. In 1914, after a study of a series of cases of mouth-breathers due to adenoids, Layton[7] stated: "If, therefore, mouth-breathing is sometimes a cause of contracted arch, there must be some other cause at work as well." The experimental and clinical evidence offered by various workers during the last two decades has caused a large percentage of orthodontists to reject the adenoid theory.

In 1929, Professor Brash, of the University of Birmingham, England, set forth in a comprehensive monograph a review of practically all the English literature and experimental work which related to the possibility of mouth-breathing due to adenoids as an etiologic factor in dental and palate deformities. He states in his conclusions: "It is still to be proved that there is any significant correlation between the presence of adenoids and the incidence of deformity of the jaw and palate." He suggests heredity as the most likely determining factor in the majority of cases.

INCIDENCE OF EXCESSIVE OVERRIDING MAXILLARY INCISORS AND V-SHAPED PALATE

For the purpose of studying the frequency with which excessive overriding maxillary incisors and the V-shaped palate occur, we made a comparative study of the dental and arch condition of 500 children between the ages of six and fourteen years. These were divided equally among the following classes: Crippled Childen's Hospital cases, white, Indian and negro school children and the same number of consecutive cases of chronic nasal allergy coming to our private Clinic. We found, as will be shown in Table I, that among the white school children there were seven who had a contracted V-shaped palate and what would be considered excessive overriding maxillary incisors. Of these seven cases, two gave a history of chronic nasal allergy of long standing. Of the 100 children studied at the hospital, there were only five with the arch and dental deformity. In neither group were we able to study the parents to determine whether or not they had a similar type of deformity. Of the crippled children studied, 20 per cent had had their tonsils out, and of the white school children, 16 per cent. Of the Indian and negro children studied, in each group there were four, or 4 per cent, with the palate-dental deformity, and only two, or 2 per cent, who had had their tonsils and adenoids out, although in both the negro and the Indian children there was evidence in many cases of excessive adenoid tissue and enlarged tonsils.

In dealing with the Indians in Oklahoma, we have been impressed with their comparative freedom from allergic diseases. One of us (R. M. B.), this summer examined the mouths of a large number of Alaskan Indians of various tribes, and also, the dental condition of a number of Eskimos. In only one case was there evidence of excessive overriding maxillary incisors and in no case did we find the Gothic arch. The striking feature of the mouth of the Alaskans and Eskimos was the dental caries found in children and young adults.

TABLE I

INCIDENCE OF EXCESSIVE MAXILLARY INCISOR OVERRIDING AND V-SHAPED PALATE BASED ON A STUDY OF 500 CHILDREN; AGES SIX TO FOURTEEN YEARS

	TOTAL NO.	NO. WITH PALATE DENTAL DEFORMITY	PER CENT	PER CENT WITH TONSILS AND ADENOIDS OUT
Crippled Children's Hospital cases	100	5	5	20
White school children	100	7	7	16
Children suffering from chronic nasal allergy	100	24	24	56
Indian children	100	4	4	2
Negro school children	100	4	4	2

Of the chronic nasal allergy cases studied, there were twenty-four, or 24 per cent, with the arch-dental deformity; and of these 56 per cent had had their tonsils and adenoids out early in life, as a means of trying to obtain relief from the wet noses from which they were suffering. The parents of some of the children with the deformity showed a similar condition. Of the twenty-four children with the deformity, similar deformity occurred in either the father or the mother in eight of the cases. Three of these parents suffered from chronic nasal allergy themselves and had suffered since childhood. In other words, there were five cases, or 5 per cent of the total of the nasal allergy group, that seemed to have inherited the deformity.

POSSIBLE ETIOLOGIC FACTORS IN THE PRODUCTION OF THE V-SHAPED ARCH AND THE EXCESSIVE OVERRIDING MAXILLARY INCISORS

From a careful review of the studies of the possible etiologic factors which have been done by both English and American workers, but especially the English, and from our own study, it appears that there are two most probable etiologic factors, which are as follows:

A.—Inheritance.—"No one supposes," says Darwin,[8] "that all the individuals of the same species are cast in the same mould."

In review of the cases we have studied, it seems reasonable to believe that inheritance might account for a large percentage of the palate-dental deformities we observed in groups of crippled children, white, negro, and Indian school children studied, but it could hardly account for the frequency with which the deformity was found in children suffering from chronic nasal allergy, as it was five times greater in this series than in the other groups mentioned.

B.—Some type of pathologic condition in infants and children that would interfere with a normal development of the paranasal sinuses.

PHYSIOPATHOLOGIC MECHANISM IN DENTAL AND PALATE DEFORMITY DUE TO CHRONIC NASAL ALLERGY

Many careful investigators believe that sufficient experimental and clinical evidence has not been offered to prove that mouth-breathing secondary to

adenoids is the cause of the dental-palate deformity which we have described. One of the arguments against adenoids as a possible etiologic factor is the fact that unless there is a nasal pathologic condition other than adenoids, the paranasal sinuses develop normally. Normal development of the paranasal sinuses would have a tendency to allow normal development of both face and jaw, which in turn would help to prevent dental and palate deformities.

Many children who suffer from chronic nasal allergy have such a pathologic condition during the entire period of paranasal sinus development, and,

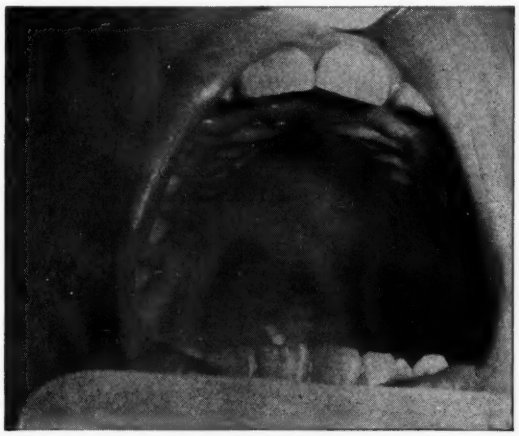

Fig. 12.—Typical normal type palate observed in Indian children. Note the broad arch.

Fig. 13.—Indian child having chronic nasal allergy of long standing. Note high palate and malalignment of teeth.

as has been previously pointed out, in many there is x-ray evidence of lack of development of the paranasal sinuses. The facial deformity which is common in these cases is clinical evidence of diminutive sinuses. Children who suffer from perennial allergy are usually mouth-breathers, but, as has been mentioned, mouth-breathing in itself does not cause dental and palate deformities. However, in a child with chronic nasal allergy, there are the additional factors of facial deformity and poorly developed paranasal sinuses.

It is generally believed that to some extent the teeth owe their position in the dental arch to the balanced action of the pressure of the lips, cheek, and

tongue. In the child with chronic nasal allergy, this balanced action is gone. Mouth-breathing over a period of years allows a pushing in of the gum, during the growing age, by the facial muscles, of which the buccinator is the most important. The muscle action would have a tendency to produce a narrowing of the arch, and this in turn would tend to produce excessive over-

Fig. 14.—A young adult, aged eighteen years, with chronic nasal allergy since an infant. Note the high arch.

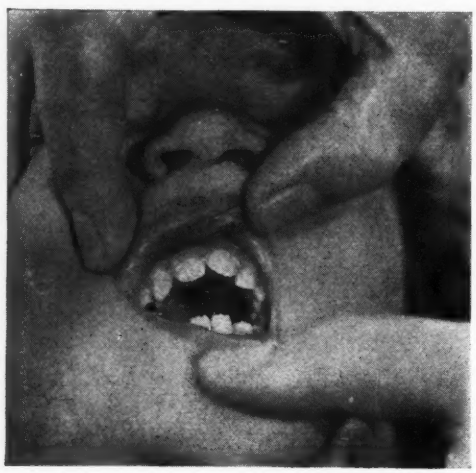

Fig. 15.—Case of chronic nasal allergy of long standing. Note that overriding of maxillary incisors is extreme.

riding maxillary incisors. The balanced action and the muscle pressure just mentioned is likewise true of children with adenoids who suffer from mouth-breathing, but in the child with excessive adenoid tissue, the normally developed paranasal sinuses push their way downward and prevent deformity of the arch. In other words, the normal development of the paranasal sinuses

which occurs in children suffering from adenoids, has a tendency to prevent dental and palate deformity in spite of the abnormal action of the tongue, lips, and facial muscles. On the other hand, in the nasal allergy child who is a mouth-breather, the diminutive sinuses and the facial deformity will allow the abnormal tongue, lip, and facial muscle action to produce the V-shaped arch and the excessive overriding maxillary incisors which correspond to the "textbook" description of a mouth-breather's palate.

CONCLUSIONS

1. Facial deformity is common in children who suffer from chronic nasal allergy.

2. Nose rubbing and wrinkling in children might be considered a pathognomonic sign of nasal allergy.

3. Excessive overriding maxillary incisors and V-shaped palate occur in about 5 per cent of the child population. The occurrence of the deformity is four or five times greater in children who suffer from chronic nasal allergy.

4. The two most provable causes of the palate-dental deformity are: (a) inheritance; (b) some type of pathologic condition in infants and children that would interfere with the normal development of the paranasal sinuses.

5. It is still to be proved that there is any significant correlation between the presence of adenoids and the incidence of the dental-palate deformity.

6. It appears that chronic nasal allergy occurring during the age of paranasal sinus development, associated with mouth-breathing, is an etiologic factor in excessive overriding maxillary incisors and the Gothic arch.

7. Heredity must be considered as an important causative factor in all types of malocclusion.

8. As a means of preventing the dental-arch deformity, the cause of chronic nasal allergy in infants and young children should be found and eliminated.

9. Some of the poor results obtained by the orthodontist may be due to the presence of nasal allergy while the corrective work is being done.

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DISCUSSION

W. E. Stoft, D.D.S., Omaha, Neb.—In the discussion of such a modern presentation of so modern a phase of medical practice, recapitulation seems permissible.

In our efforts as orthodontists we have noted certain generally accepted theories first questioned and then revised. Textbook orthodontia followed many other orthodoxies, being revised by new concepts. Thumb-sucking, adenoids, mouth-breathing, the dietary, endocrinology and other concepts have first been devised and later revised. More than likely allergy will prove another revolution of the wheel of evolution in our specialty. As presented to us today it is apparent that allergy is an etiologic factor heretofore overlooked in a certain type of malocclusion. Duke has suggested the *facial* type, and since becoming interested in the subject I have noted some probable allergic cases. May I suggest, however, that allergy is not a true cause but only a knock or squeak in the human machine. What is back of individual sensitivity to certain agents, food, drugs, etc., is only a peculiar idosyncrasy or a fault in the machinery; hence it corresponds to a knock in a motor. However, when the knock is eliminated, we believe the machine is repaired and in one sense the cause is removed.

Individualism is apparent in outward appearance, facial features, walking gait, mannerisms, etc., and these apparent variations are very likely greatly multipled internally. Digestion and assimilation as described in physiologies apply only to the synthetic individual, the ideal, but we approach this ideal about as nearly as outwardly we men resemble Apollo or our women resemble Venus. Various digestive juices probably vary greatly in constitution, quantity and quality. But even these must vary in the same individual from time to time. It is only natural, therefore, that a method of ferreting out individualistic susceptibilities should be hailed by us as very valuable. We can very well be grateful to Dr. Balyeat for considering us and so ably designating the bearing that nasal and sinus allergy has upon our problem. Naturally Dr. Balyeat's reward will be realized when we hereafter recognize possible allergic cases and refer these to some internist or allergist for a check-up.

In a rather superficial review of current literature on allergy I have noted that Hansel of St. Louis says, "Even virulent bacteria are known to be present in the nose without producing symptoms until some constitutional condition permits them to become active and harmful. In allergy, however, the impaired movement or absence of cilia should lead to the retention of bacteria." Hansel quotes Dean as saying that "it is well to consider all chronic nasal-sinus disease in children as being possibly allergic until that factor has been excluded." Several investigators agree that bacterial infection, focal and general, is not the etiologic factor that produces allergic manifestations in the respiratory tract. They believe that infection may be present in the respiratory tract in the presence of an allergic condition but that it is purely coincidental or secondary to the already existing allergic disease.

It seems that infection depends upon the susceptibility of the host rather than on the virulence or presence of bacteria, and that allergic states open the gate for the invasion. Each case, however, presents one or more peculiarities requiring individual attention. Allergy is the susceptibility of individuals to react malevolently to one or several proteins which in the average person produce no disturbance. The progress medicine has made recently in testing for sensitivity must be gratifying but naturally will lead to further discoveries.

As long as we are green we are growing! The small mind is positive and therefore static.

Dr. Charles A. Spahn, Newark, N. J.—Dr. Balyeat showed on the screen the girl he was treating for this allergic condition. I should like to have him tell us how long he has been treating her, or how long he expects to treat her in order to eradicate this trouble, and whether the pediatrician in this part of the country realizes this condition early enough in the child's life to institute treatment of a basic nature to ward off these conditions.

Dr. F. C. Holmes, Mangum, Okla.—If proper nose breathing were instituted, it would develop the sinus, if anything. That is what we have always been taught, and it seems a very simple proposition to me.

Dr. L. M. Waugh, New York City.—The more one studies the interrelationship of the nasal area with that of the orthodontic area, the more one feels we must be impressed with the importance of collaboration in our study of the problems underlying disturbances in the two areas, and the more must one be impressed with the importance that the orthodontist in carrying on his treatment must collaborate with the rhinologist if the best result is to be obtained in the shortest time.

The same blood nourishes the nasal area, which is so close especially during the developmental period, traveling just a wee bit farther, a quarter of an inch sometimes, and merges over into the orthodontic area. Anything pathologic in one will be disturbing in the other, and I feel the nasal area is almost more fundamental to the development of that part of the face than the orthodontic area.

A number of important points were brought up. There is one question I should like to ask the essayist: To what extent does he feel that the loss of atmospheric pressure in the maxillary sinus might retard or might rob the normal urge in the development of the maxilla? There are fifteen pounds of pressure to the square inch. When the orifices of the maxillary sinuses are occluded, the pressure is reduced or made almost nil, and the fifteen pounds to the square inch are a great deal more pressure than the human cell can ever exert when it develops normally, or even pathologically in malignant disturbances.

To me that is an important thing, when the orifice of the maxillary sinus is occluded and we find that this region of the face, as was shown in some of the slides, is lacking in development. Indeed, I have seen adult patients where this part of the face was quite well developed, the lower margin of the orbit and the tissue beneath, and four or five years later when the patient had developed a chronic catarrh or rhinitis the bones and the overlying tissues seemed to have settled down and the physiognomy had changed. That does not involve the orthodontist as proving a great chance for change.

I was also very much interested in the observations spoken of among the people of Alaska. I have also been very much interested and quite disappointed in the observations of one of our own dental observers in what he found in Alaska.

If we superimpose the map of Alaska over the rest of the United States, we shall find that Point Barrow and the rest of that region will touch the Canadian border, while the lower part of Alaska touches the Mexican border, and the eastern part of Alaska will touch the Atlantic Ocean, and the most western of the Aleutian Islands will touch in the neighborhood of San Francisco.

So when we have an area that great—if you will pardon the friendly criticism—I think it is hardly fair for anybody to say, "I have studied the Indian and the Eskimo and find that 35 per cent need dentures."

After five summers in both Labrador and Arctic Alaska, and crossing into civilized Asia, if one approaches the Eskimo in his primitive state one will find there is less incidence of dental caries among them than in any race known. They are small of stature, with the largest jaws and the best teeth that have ever been seen in human beings. So one must specify where he has studied in Alaska, because it covers such a vast area.

I have made as a concluding statement in my reports of the study of the Eskimo of Labrador and Alaska, that the Eskimo is paying for his civilization with his teeth, because as white man encroaches upon him he takes his foods, specifically his carbohydrates and more definitely his sugar which help to give warmth to the blood in a cold climate. The Eskimo is very fond of them and eats all the cheap molasses candies he can. We find in those mouths that the teeth of the children decay vastly more rapidly in proportion to the Eskimos who live in primitive, nomadic bands and subsist on native foods. They have marvelously good teeth.

Then the question of food and heredity is very important. Heredity is a very important factor in orthodontia, and I want to emphasize a difference in heredity as it

influences the body of the maxilla and the mandible as compared with that of the alveolar process. I see a very definite line of cleavage. We make radiograms of the mouths of children where perhaps there are only two or three follicles for permanent teeth resident, and yet we get a mandible almost as large as it would be in horizontal size, not in strength, with all of the teeth present. Heredity determines, in my opinion, the shape of that mandible. We may find in a mandible of that size teeth that are very much crowded and overlapped.

That is seen so plainly in the Eskimo, where he chews his native food of frozen fish and meat uncooked and often frozen much of the time. Through these exercises especially during the developmental period, the Eskimo develops these tremendously large jaws. From the casts many of you have seen through the years as I presented them, we see practically no irregularity of the teeth.

But around such regions as Hopedale, Mugford and the missions in Labrador, and around Nome and that section of the Bering Sea in Alaska for a generation or a little more, dating about the time of the World War (because we had an army post at St. Michaels and the soldiers traded sweets for furs and ivory), in one generation we find the teeth of a child crowded and overlapped horribly, whereas those of the parents and grandparents were normal in size, altogether regular, and almost free from dental caries.

You will say, "How can we have so marked a change in that arch in the past generation?" While heredity may determine the size of the body of the bones, it is the physiology, the use, the action; it is the chewing, if you will, that largely determines the shape of the jaws and develops alveolar borders sufficiently large to accommodate the teeth in their normal position. In the orthodontic problem I believe we must draw the line between the heredity which influences the body of the jaws and the physiologic action or the use which determines very largely the size and the form of the alveolar process.

Evidently we saw that part of Alaska in which the civilized people live. Evidently we did not get way up into the parts where it is difficult to reach. The privilege, as my friends know, was granted me through a commission of the Public Health Service, and for each of two summers I traveled four thousand miles aboard the coast guard cutter Northland. I had the privilege and duty of looking after the dental welfare of the natives, and also had the privilege of making this research study.

Unless one has an unusual opportunity for getting to the Arctic Ocean and the polar seas region, where the Eskimo does not have contact with civilization, one does not see the Eskimo as he is in the primitive state. In that state he has the largest jaws, the finest teeth, and the least incidence of caries of any race known. But just in the proportion that he has white man's food do his teeth decay.

We must not say Alaska in general. We must be specific as to what part of Alaska is referred to.

This contribution will be valuable, and I hope it will stimulate us more and more to collaborate with the rhinologist because I know it will be to the best interests of our patients if we do.

Dr. Thomas M. Robertson, Coffeyville, Kan.—I want to ask the author whether these cases which we term allergic could not possibly start from simply the fact that when the child is born the phlegm is not cleared from the nose. You notice that a great many children are mouth-breathers.

Dr. Ray M. Balyeat, Oklahoma City, Okla.—There are two or three things about the allergic individual that I have been very much impressed with the last few years, and which I wish you who deal with those who suffer from dental arch deformity would notice. The average individual who has an allergic manifestation, whether migraine, hay fever or asthma, in many cases is a high type of individual. Whenever you see an individual with hay fever, you can put it down he is a high type of individual, that is, ordinarily. Our President is a hay fever patient.

Hay fever, asthma, migraine and urticaria fall in that class of individuals who are born with a peculiar hypersensitive make-up; that is, they are born with a cellular make-up

that is hypersensitive. The cells throughout the entire body, including the liver, heart, and brain are hyperactive, and consequently if these individuals are born with that peculiar ability to become sensitive and have hay fever, asthma, hives or sick headaches, they are born with cells of the brain that are also hyperactive, and consequently their thinking ability is much above that of most people. There is no question about that. We studied a large number of children a few years ago from that standpoint, and we found that 75 per cent of the children with allergic manifestations had I.Q.'s above normal. I just want you to watch these children who come in with dental arch deformity and see if they are not *A* students in school. I think you will find they are.

Somebody is saying right now, "That is just because only those patients with monetary ability come to us for their dental arch deformity correction." That is true to some extent, but that is not entirely true. There is no question at all but that those children who are made upon the same pattern their fathers and mothers were made on, and who inherit this thing in the way of a typical inheritance (I am referring now to inheritance whether they develop the arch their father had or their mother had) may not have mental activity above normal. But those individuals who have migraine and asthma you will find to be *A* students in spite of their congested nose and sniffling.

In regard to food sensitization, as a general rule we say that in an individual who develops symptoms of allergy, whether it be asthma, hay fever, hives or sick headaches, before he is ten years of age, food is one of the very important factors. It is an extremely important factor if he develops his symptoms before five or six. Consequently, in dealing with children with chronic nasal conditions, specific food elimination, of course, is the method of treatment.

I believe it was Dr. Stoft who asked concerning the girl I showed on the screen who is now under treatment. This girl is having the dental deformity treated at the present time. We have treated her for several years. She has sensitization to animal danders, dusts and pollens, and also has marked sensitization to food. As a rule, if it is only caused by foods, all you have to do is to take the foods out of the diet for a few weeks, a few months, or a year or two. But where sensitive to animal dander or pollen, desensitization has to be done for a longer period of time, usually over thirty-six months and longer if necessary. Where there is a chronic allergic condition, especially where it is based on sensitization to animal dander or pollen, we have to do as you do, watch it for three years, four years if necessary, five years if necessary, and ten years if it requires that length of time.

If we can take chronic congestion of the nose at four years of age and prevent lack of development of the paranasal sinuses, and let the individual develop a normal type of face without the pinched expression, a type of face that is pleasing whether it be in the male or female, when he becomes an adult his ability to carry on a gainful occupation is very much greater. Consequently, we feel these cases have to be treated over a period of time, usually thirty-six months.

In regard to atmospheric pressure, I have not thought of it that way, but certainly the paranasal sinuses, especially the antrums that are blocked with mucus all the time, must have a different pressure inside than if they were not blocked. Consequently, it may have something to do in interfering with the development of these sinuses and antrums. We feel, however, that any structure lined with mucous membrane that is constantly coated over with mucus does not develop normally. The pressure might have a good deal to do with it, and probably does. It sounds very feasible.

In regard to the Indians in Alaska, it is true that the only ones I saw were around the canneries and in the hospitals, and likewise the only Eskimos we saw were chiefly at the hospitals, but we saw them from various sections, from the eastern portion up toward Nome and down toward the Aleutian Islands.

The thing I was impressed with primarily was the fact that so many of the Indians, Eskimos and native white people of thirty and thirty-five years of age had false teeth.

The thing that made me interested primarily was the fact that a number of years ago when I first started to study the subject of migraine, we found that milk was a very common etiologic factor. Taking milk entirely out of the diet, even to the *nth* degree where we eliminated even butter and cream or any foods that milk goes into, we found that adults began to lose the fillings in their teeth. Naturally, I was extremely interested in the lack of the use of milk; and in Alaska, as Dr. Waugh who talked to us a few moments ago knows so well, there was no milk. Many of the natives, and many of the white people from early life have had very little milk.

Long ago, we found it is very important, when milk is taken from the diet, if it is eliminated very thoroughly, to add calcium in some form. Consequently, we never eliminate milk from the child's diet. We never eliminate it completely from the adult's diet over a long period of time. We add calcium phosphate, also a certain number of units of vitamin A and also vitamin D.

THE CRISIS IN ORTHODONTIA*†

Directions for the Practice: Does the Use of Continuously Acting Force Guarantee the Best Biologic and Clinical Results?

Albin Oppenheim, Vienna, Austria

(Continued from page 336, April)

Case 2.—Infirmary case. Patient, ten years old. Premature loss or extraction of V | III V, causing shifting: | 2 has wandered lingually, | 1 distally, causing thereby a diastema (Fig. 16); 6 | has moved somewhat forward, thereby slightly reducing the space for 5 | which is just erupting; | 6 shifted forward very markedly, entirely closing the space for | 5 (Fig. 21); 4 | 4 somewhat rotated, in the same level; on the left side, lingual occlusion of | 6 (Fig. 17).

Diagnosis: Class I; mutilated case.

In conformity with the analysis the treatment of this case (usually offering no considerable difficulties) must be performed: expanding on the left side; mesial movement of | 1 2 to close the diastema; distal movement of both molars, on the left side more than on the right; and rotation of 4 | 4 (lingual cusp mesially) to gain the necessary space for 5 | 5.

The lingual arch was used exclusively in the treatment. At first the lingual occlusion of | 6 was treated, and at the same time | 1 2 were moved frontally and to the right by means of finger springs in order to gain the space for | 3, which erupted spontaneously after the necessary space had been created (Figs. 20 and 22); the crown of the | 1 has markedly tipped mesially (Fig. 19). These movements were performed within eleven months, including two months' rest during summer vacation.

In January, 1931, the appliance was changed, and in order to move the | 6 distally by the "distal spring" (Schwarz), a new lingual appliance was placed on 6 | 4. This spring was in place until June 20, 1932 (that is, for fifteen months), until apparently sufficient space for the | 5 was gained; during this time several fractures of springs and locks occurred. For the two months' vacation, a vulcanite plate was made to keep open the space gained for the | 5 by means of two spurs resting against the approximal surfaces of | 4 6 and thus waiting for the spontaneous eruption of the | 5. As this tooth had not yet erupted in the autumn of 1932, a new lingual appliance was inserted to rotate | 4 in order to open the space still more, for it was assumed that lack of space was the reason for the noneruption of | 5. Notwithstanding all these measures | 5 had not yet erupted in January, 1933; a radiogram made at this time revealed the reason for the noneruption of | 5 (Fig. 23).

*From the Department of Orthodontia of the Dental Institute of the University of Vienna.

†Translated from *Zeitschrift für Stomatologie*, Nos. 7 and 8, 1933, published by Urban and Schwarzenberg, Vienna and Berlin.

This Fig. 23 shows the position of the impacted | 5 at the beginning of the treatment. The "distal spring" had tipped the crown of the | 6 very much distally, its root mesially (Fig. 24). By the attempted rotation of | 4 (perhaps

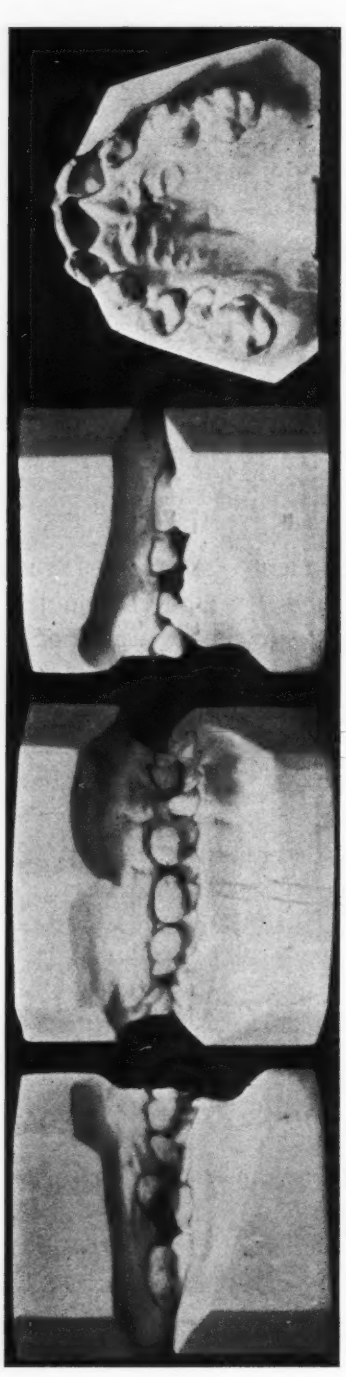

Fig. 15. Fig. 16. Fig. 17. Fig. 21.

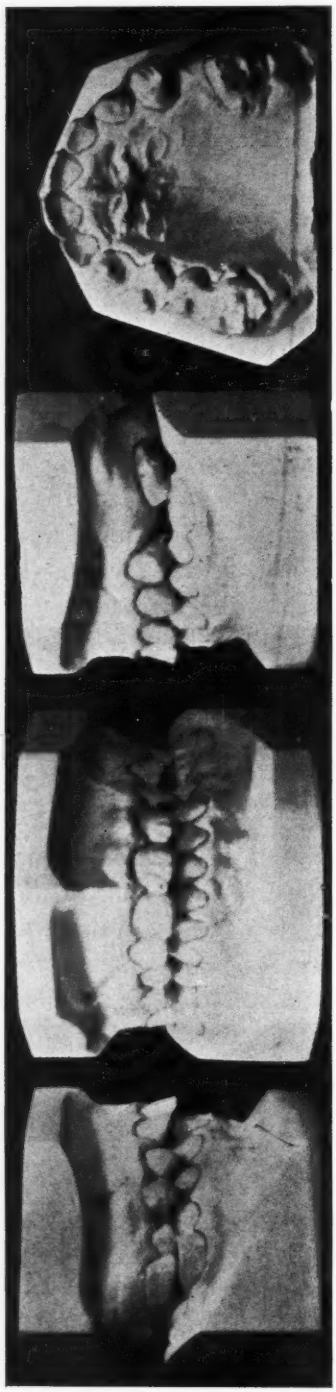

Fig. 18. Fig. 19. Fig. 20. Fig. 22.

already before) the crown of | 4 has tipped considerably mesially, its root distally, so that the roots of | 6 and | 4 are now in extensive contact and thereby make the eruption of | 5 impossible, for its crown lies now between and above

the roots of | 4. The strong tipping of | 4 can also be recognized by the large widening of the septum between | 4 and | 3 (compare Fig. 23, *x* with Fig. 24, *x*). This tipping can also clearly be seen on the models (Figs. 20 and 22).

The patient now wears a vulcanite plate which leaves the teeth full freedom of movement, except for the two spurs resting against the approximal surfaces to maintain the space gained; we shall see whether these strongly tipped teeth will be straightened again by the functional forces, thus opening the space between the roots of these two teeth, which alone can make the eruption of | 5 possible. It is scarcely to be hoped that such a strong deviation of the roots can still be corrected by function, and later measures depend on the final outcome.

Any further comment is unnecessary.

CASE 3.—Patient, twelve years old. On the left side, end-to-end bite in the region of the premolars and molars (Fig. 27); on the right side same condition, though not so pronounced (Fig. 25). Between the maxillary and mandibular canines and premolars spaces of 2 mm.; deep overbite. Etiology unknown; tongue of normal size; as there is no habit, chances are that the successfully performed treatment may bring about a permanent result.

Fig. 23.

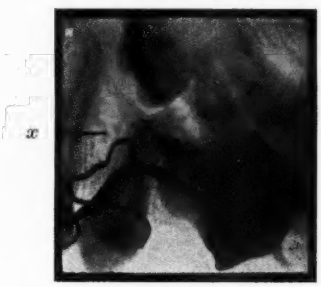

Fig. 24.

Diagnosis: Class I.

This case had been treated elsewhere for seven years as Class II, on account of a wrong diagnosis, and without any results.

The treatment was limited to the mesial movement of the mandibular posterior teeth until the spaces between the premolars and canines were entirely closed, thus eliminating the end-to-end bite and restoring normal occlusion of the posterior teeth (compare Figs. 25 and 27 with Figs. 28 and 30). In the maxilla the treatment was limited to the distal movement of the canines, until the spaces between these teeth and the premolars were closed, and to a slight lingual movement (approximately 2 to 3 mm.) of the four incisor teeth.

The deep overbite was corrected by a maxillary vulcanite plate. As will be shown and proved in a later chapter, the correction of the deep overbite means correcting the compensating curve, performed *not by an active shortening of the front teeth, but by natural elongation of the posterior teeth without any mechanical help—the only way to obtain permanent results in correcting the compensating curve.* That the compensating curve was really corrected in this way can be seen by comparing Fig. 31 with Fig. 32, which show clearly the elongation of the premolars and the elongation and straightening of the molars;

the models were not "retouched"; the overbite has become normal and will remain so, *contrary to the frequent failures if the correction were performed either by active shortening of the anterior teeth or by active elongation of the posterior teeth.* (For details see later chapters.)

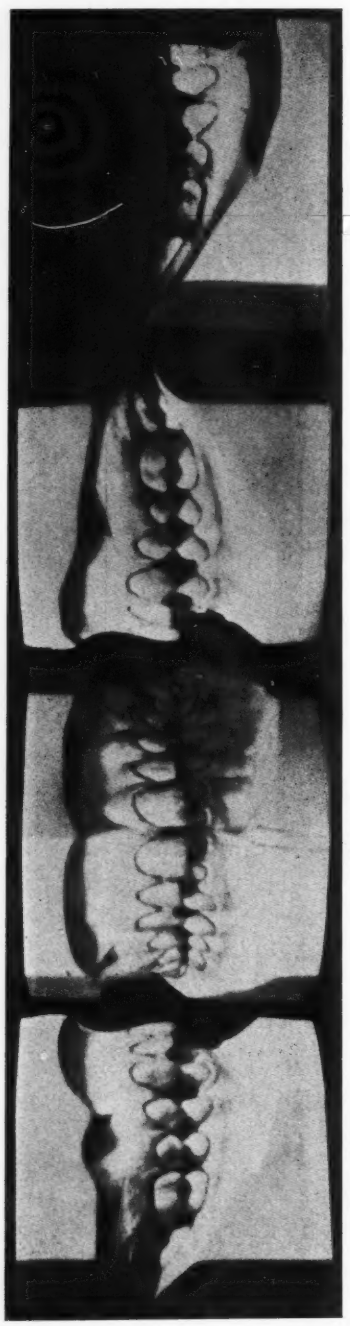

Fig. 25. Fig. 26. Fig. 27. Fig. 31.

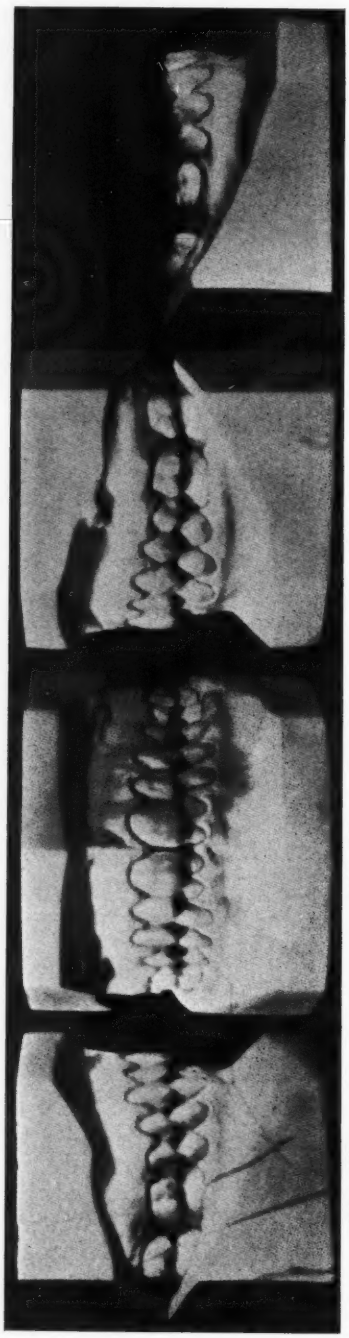

Fig. 28. Fig. 29. Fig. 30. Fig. 32.

The mesial movement of the mandibular posterior teeth and the distal movement of the maxillary canines were performed by intermaxillary elastics running from the maxillary canines to the mandibular molars. To avoid a

rotation and a tipping of the molars, the hooks were soldered to the mesiobuccal angles of these teeth, and the molars moved forward, guided by lingual tubes engaging a lingual arch, which was soldered to canine bands (Fig. 33). These tubes are open distally and are oval, in the long direction of the oval, twice or two and one-half times as wide as the diameter of the arch. This arch, 1.2 mm. thick, made of the hardest material (platinum gold) leaves free the lingual side of the premolars and lies in the upper part of the oval tube; on account of this position, there remains a free space of one and one-half times the diameter of the arch in the lower part of the tube, and this distance (one and one-half times the diameter of the arch) the molar can elongate. If there develops a contact between the arch and the lower wall of the tube due to elongation of the molar, the tube must be resoldered in a higher position. The pull of the

Fig. 33.

elastics is transmitted from the molars to the premolars; the end of the arch, which in the degree the teeth move forward becomes free at the distal end of the tube, is ground away.*

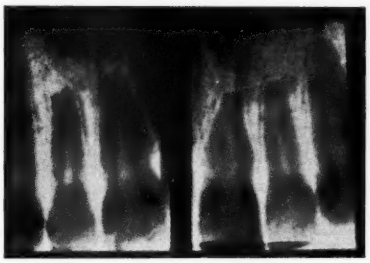

Fig. 34. Fig. 35.

The mesial movement accomplished by this procedure took exactly one year's time (October 5, 1931, until October 14, 1932); the same time was needed to bring the maxillary canines distally a distance of only 2 mm.

Until these movements were performed, the maxillary anterior teeth were not touched; there were only two canine bands with hooks. On October 14, 1932, a high labial arch was adjusted; corresponding to the middle of each tooth a spring, 0.4 mm. thick, was soldered and wrapped once around the arch, which spring received a tension slightly more than 1 mm.; this amount of tension was ascertained by measuring the distance of the spurs soldered to the arch just in front of the tubes, which spurs were slightly more than 1 mm. away from the tubes after the tension had been given to the springs; the arch was now pushed distally until there was contact again between the spurs and the tubes, and the arch was fastened in this position to the tubes by ligatures. To counteract the mesial pull of the springs on the molars, intermaxillary elastics were

*The same procedure is followed if $\overline{5 \mid 5}$ are missing and $\overline{6 \mid 6}$ have to be brought forward.

applied from the arch to the mandibular molars; on November 11 (after twenty-eight days) the force of the springs was renewed in the same way and to the same degree, and on December 5 (after twenty-four more days) the result shown in Figs. 28, 29, and 30 was obtained; a Hawley retention plate was adjusted.

In the time of seven weeks and three days, necessary for the lingual movement of the maxillary anterior teeth, rather severe root resorptions on all the four incisors had developed (Figs. 34 and 35).

My fault in the production of these resorptions may *perhaps* lie in the fact that the intermaxillary elastics—contrary to my principle otherwise always applied*—had, for technical reasons, been worn by the high labial arch, which caused a continuous jiggling of the arch; this jiggling presumably is also considered as a predisposing factor for root resorption.

Still, Korkhaus[40] says of the high labial arch (p. 179): "The high labial arch, nearly invisible, is especially well suited for the retrusive movement of the maxillary anterior teeth."

(To be continued)

*Oppenheim[18] (Root Resorption in Orthodontia): "If elastics are worn by the same arch from which individual tooth movements are performed. . . . , we often encounter disagreeable occurrences on account of the constantly changing force of the elastics: this force depends upon the strength of the eleastics, upon the distance of the arches during rest and speaking, and not the least upon the good will of the patient, whether and how long he wears the elastics . . . To avoid these disagreeable occurrences (which may cause root resorption on account of the constantly changing amount of force), I work in such cases for many years with two arches; the lower arch, in contact with the teeth, serves only the purpose of individual tooth movement, the second high labial arch serves only as anterior point of application for the elastics . . . ."

A METHOD OF TREATING CROSS-BITE*

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THE only thing that is absolutely certain in orthodontic treatment is that every case has differences and peculiarities of its own. Such a thing as an exact classification as to type which would indicate a standardized method of treatment for a particular type of case, not only does not exist, but is the most dangerously misleading conception that can be acquired by any one trying to practice orthodontia.

Cross-bite cases all have a common, well-known characteristic, but the similarity ends there, as this characteristic is always associated with other factors which always have been and always will be different in every case, and may call for wholly different treatments, depending upon the differences in these factors and their infinite recombinations. The causes of cross-bite may be various.

Case reports mean nothing at all unless they represent the intelligent and logical application of basic principles which are applicable to all cases regardless of what the particular disposition of the teeth, relation of the jaws, and other factors may be. There is probably nothing more fatal to good orthodontic treatment than employing methods or viewpoints which inhibit the capacity for visualizing the problems in their entirety.

Fortunately for orthodontia, there are a few basic principles of universal application which permit of wide latitude in concept, diagnosis and prognosis, and upon which a rational system of treatment may be instituted.

The object of this report is to present the application of these principles to a specific case of cross-bite. The fact that the subject matter is supposed to deal with cross-bite, however, is of minor importance in view of the broader outlook which these opening remarks have purposely been intended to emphasize. I do not feel that the particular form of malocclusion as in cross-bite could be correctly approached from any other viewpoint.

Before deciding upon any form of treatment, mechanical or otherwise, every case of malocclusion requires that several decisions of vital importance be made by the orthodontist. The final arrangement of the teeth is determined by the structural and functional limitations of the individual, and not by any preconceived idea of normality, which cannot be definitely located for the individual in terms of the average of a group.

Plaster models are but artificial replicas of a very circumscribed area, and whether gnathostatic methods are used or not, convey a very slight idea of the dynamics of function of the individual from whom they are taken. Per se, they can be very misleading in conveying to the operator the actual condition upon which he should be informed. Orthodontia is concerned with dynamics from start to finish.

*Presented at the Thirty-Second Annual Meeting of the American Society of Orthodontists, Oklahoma City, Okla., Nov. 8-10, 1933.

Obviously the ideal way to gather the vital data necessary is from a personal study of the actual individual, both in repose and in function. In this way alone can a correct estimate be gathered of not only the gross factors of structural proportion, muscular tensions, and mental capacity and control, but also all the idiosyncrasies of function and personal interest of the patient, so important to successful treatment.

This leads to the first general principle of actual treatment to be employed which is so far reaching in its importance that its value can hardly be overestimated.

The first step in any type of malocclusion, is to *direct the patient to occlude the jaws in as near the position which appears most desirable, as possible.* This immediately discloses, in the simplest and most revealing manner, the exact condition of affairs and shows just what the interference is which prevents the patient from doing so habitually. At this point the true orthodontist should allow, as far as possible, the most complete freedom of action to his intellectual, artistic and intuitive faculties, tempered at all times by his common sense, clinical experience and observation.

This interference may be malposition of certain teeth in their horizontal relationship, their anteroposterior relationship, or their vertical relation, or any combination of these. In some cases the first immediate interference may be the simple torsoversion of one tooth. After this has been thoroughly studied, *the first logical step in treatment should be to remove the interference, and this should be accomplished with appliances best suited to the peculiar requirements of that particular individual case.* In the natural order of things, concepts come first, general principles of treatment, second, consideration of the factors involved, third, and finally the type of appliance to be used for the particular case (when necessary). The great ingenuity of orthodontists has produced a vast variety of appliances, and it is the job of the orthodontist to select from this material the ones best suited to the particular case he is going to treat.

Anatomic landmarks are always in a state of flux, particularly during the growing period, and far more so during treatment when mechanical force is followed by actions, reactions and interactions, and when changes in function are at play.

The second general principle is that as action is followed by reaction, and accompanied by interaction, a *complete re-evaluation of the case should be made at each visit of the patient,* and that the nature of the next step in mechanical interference should depend entirely upon the new set of conditions which the previous treatment has produced.

The third general principle is to *consider always the relationship of the jaws from the standpoint of a unit, and never undertake individual movements of the teeth of one jaw or changes in the relationship of the jaws without due consideration for compensatory and complementary movements in the opposing jaw.*

The fourth general principle is that *all orthodontic work is performed on living subjects and as such is influenced by all the cooperation and assistance of*

which the patient is capable, particularly in regard to the control and direction of muscular effort. At all times the minimum of actual mechanical interference should be employed.

As a specific case of illustration, I selected the one shown in Figs. 1*A*, 2*A*, and 3*A*. Before considering treatment in any case, a general survey of the sum total of conditions as they present themselves, and as far as we are able to

Figs. 1 to 4.

estimate them, is the first requisite. Like a good general, an orthodontist should plan his campaign at the start. As many of the factors he will have to deal with are unknown quantities and can only be determined during the course of treatment, he should have his mind free at all times to observe the reactions of the tissues, the degree of cooperation he is getting from his patient, and every other factor concerned with the case and be ready at any moment not only to change his method of treatment, but even his final objective. A course of treatment

depending naturally on conditions usually resolves itself into phases in which at one time a certain objective is desirable in its relation to the whole, and, after this has been attained the next step or phase may follow in which the nature of the problem may be different, requiring a different type of appliance for its accomplishment. It is a well-known principle of Napoleon's that one of his favorite tactics was to mass his entire force against one spot which would have to yield in consequence. This principle is also applicable in orthodontia, as I shall try to illustrate in the case I have selected for treatment.

In this particular case, this survey disclosed some definite facts which were immediately self-evident and some others which contained a somewhat speculative element. All of these, however, had to be considered from the standpoint of a whole in order to arrive at some conclusion as to what produced the malocclusion, the possibilities and limitations for improvement, and the best means to be employed in treatment.

Having in mind that the objective of treatment can hardly be more clearly defined than "the best arrangement of the teeth and jaw relations within the structural, functional, and esthetic limitations which will produce the most satisfactory ensemble, that will remain in a permanent state of balance after treatment has been completed," we may briefly summarize the facts as we see them and base our methods for treatment on these findings. It will be noted that the case presented a linguoversion of the first and second right maxillary molars, and the second right maxillary premolars, a unilateral distoclusion of the right side, and a mutilation due to the extraction of the left first maxillary molar. It seemed quite evident from the general appearance of the left maxillary teeth that a considerable amount of natural tissue readjustment had taken place some considerable time before the patient presented himself for treatment, inasmuch as the second left maxillary molar had drifted mesially until it occupied the position which should normally have been occupied by the left maxillary first molar.

It also seemed likely that the remaining left maxillary teeth had drifted distally to varying degrees, judging approximately by the position of the median raphe. These normal tissue readjustments had produced a condition which could be considered fairly satisfactory from a functional standpoint, in the relation of the left second maxillary molar, first and second left maxillary premolars, and left maxillary canine. The maxillary incisors were in marked labioversion, apparent by the spacing between the central and lateral incisors, and the esthetic relation which they bore to the balance of the facial features. While at rest the overbite was also unsatisfactory inasmuch as the mandibular incisors were in contact with the palate.

At this point several very important decisions had to be made affecting the whole course of treatment in view of the objective which has been stated. The following questions were then considered in order:

1. *The question of anatomic proportion between the amount of tooth substance and bony development.* Unless there is present, or unless a satisfactory amount of bony tissue can be produced to establish a balance to accommodate satisfactorily the tooth substance present, no permanently satisfactory results

can ever be expected. In this particular case, the clinical appearance indicated that it was probable that the bony development of the jaws could satisfactorily accommodate all the teeth present from both the esthetic and the structural viewpoints. The reasons for arriving at this conclusion were based mainly on the general development in the region of the apical bases of the teeth and a mental picture of what the esthetic appearance of the teeth would be after these had been moved to their new positions, and after the mandible had also been moved to its correct relative position anatomically. I make no claim of any more precise scientific means in arriving at a conclusion of this kind, and my judgment is based almost entirely on accumulated clinical observation. I know of no scientific yardstick to determine this.

2. *The question of changes in the functional activity appeared to promise favorable response to treatment* by establishing a more satisfactory position for the mandible after certain teeth had been moved to positions which would make this new orientation possible. The reasons for arriving at this conclusion were again based upon a mental picture of the improvement which this change would produce and the fact that I was dealing with a highly intelligent patient from whom I could expect a high degree of cooperation in regard to her own muscular activities in order to produce the desired result.

3. *The mutilation due to the extraction of the first left maxillary molar and the forward drift of the second left molar produced a dilemma with two very clearly defined choices:* (a) to move the second molar back to its original position, and to restore the first molar prosthetically; or (b) to leave the second molar in situ, allowing it to function as a first molar for all practical purposes. With all due respect to the individual differences of opinion on these two choices, and to the proponents of the former alternative, the latter alternative was selected, thus conservatively avoiding unnecessary hazards, difficulties, and sequelae, in unnecessary artificial tissue readjustments. After many years of clinical observation on dilemmas of this kind, I have not yet become convinced that there is anything sacrosanct in the dictum "thirty-two teeth are always nature's plan" and therefore imperative, regardless of other considerations.

Having made these three decisions, the course of treatment was then taken under consideration. In order to determine the first step in treatment, the patient was instructed to place the jaws in as near the position of so-called normality, or "mechanical advantage" (Rogers) as the malocclusion would permit. This was in accordance with the first principle of treatment as outlined in the introduction. The effort to do this is illustrated in Fig. 4. It will be noted among other things, that the overbite presented a totally different picture in this attempt, a fact which should be considered in every case. Placing the jaws in this position disclosed the fact that the major interference with even a modicum of satisfactory occlusion was the constricted condition of the maxillary arch in the region of the maxillary molars and premolars, and that the immediate interference which prevented the mandible from swinging to the left to correct the distoclusion of the right side was the linguoversion of the maxillary left canine and premolars.

In determining the first mechanical appliance to be used, sight was not lost of the fact that the left maxillary molar and premolars were in a fairly

satisfactory buccolingual and mesiodistal relation to the mandibular teeth, and at this stage should not be disturbed, but that the right first and second maxillary molars and second premolars should be moved buccally. To move these teeth into their new positions, the appliance illustrated in Fig. 5 was inserted. The basic principle of this appliance was to pit the combined resistance of the maxillary left molar, premolars and canine against the single second right molar. This involved the general basic orthodontic principle that teeth move in response to mechanical force, however, not according to simple elementary physical laws, but rather according to complicated extensions and modifications of these known and described as physiologic laws. It will be noted in the illustrations:

(1) A lingual stabilizing bar was soldered to the left molar band extending mesially in apposition to the first and second premolars.

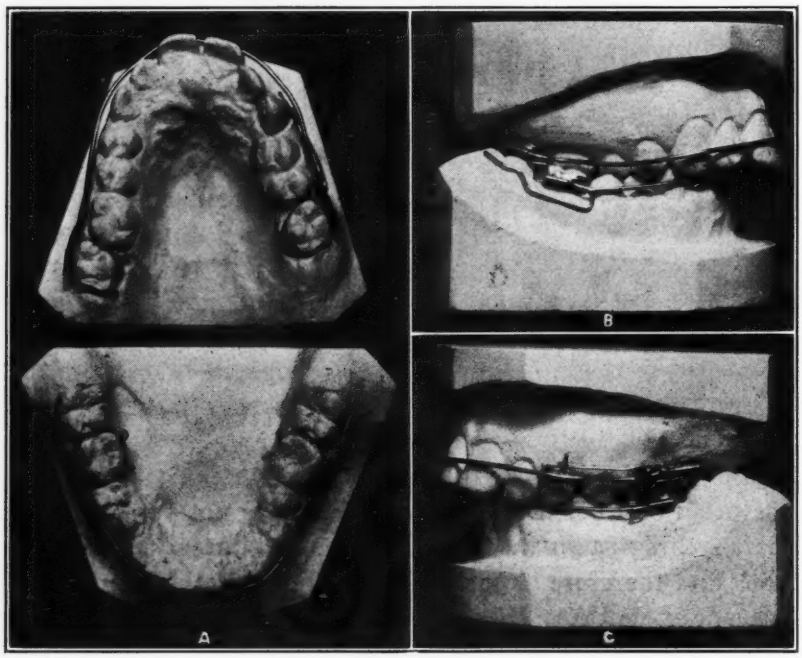

Fig. 5.

(2) A labial auxiliary spring was soldered to the labial arch and sprung under a bracket hook attached to a band on the left canine, exerting pressure buccally on this tooth.

(3) An auxiliary bar was soldered on the labial arch occlusally to the buccal tube and bent lingually so as to exert torque on the maxillary left molar to prevent tipping and at the same time benefit by the added resistance of the molar roots which the torque of the labial arch would produce.

The diagram shown in Fig. 6 illustrates the dynamics of the appliance shown in Fig. 5 *C*.

The labial arch was inserted with sufficient expansion to carry the second right molar to its correct buccolingual relation to its lower antagonists. This was the first step in treatment.

After this tooth had been moved to its correct buccolingual relation, its position was consolidated by inserting a maxillary lingual arch, having previously, of course, removed the lingual bar which was soldered to the band on the maxillary left second molar and replacing this by a lingual attachment on the left second molar to receive the left end of the maxillary lingual arch. (Fig. 7.)

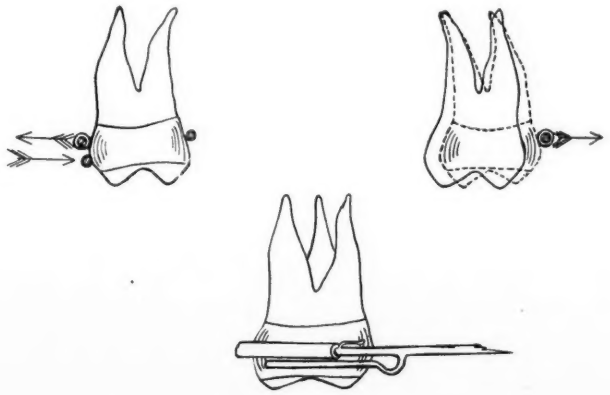

Fig. 6.

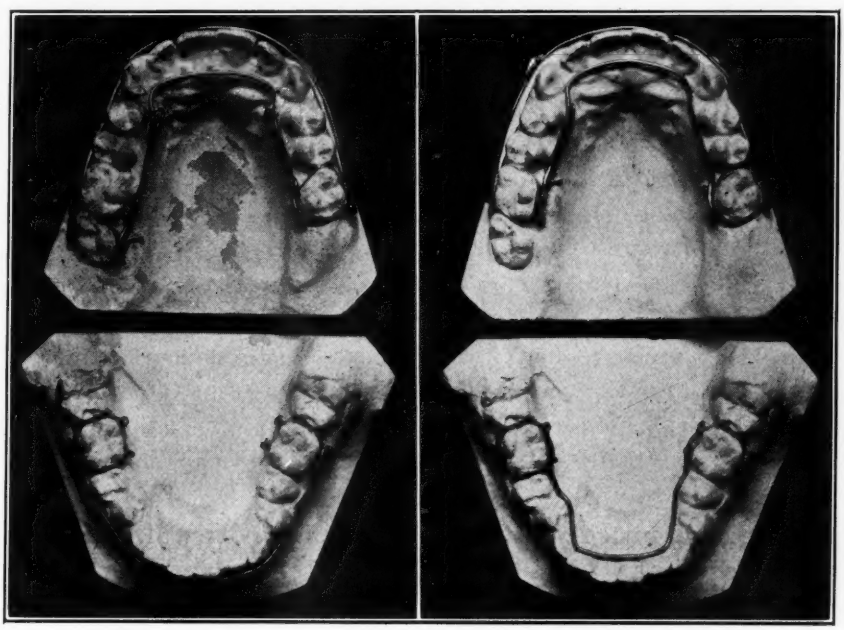

Fig. 7. Fig. 8.

A lingual auxiliary spring was then soldered on the right side of the maxillary lingual arch to exert pressure on the first maxillary right molar to carry it to its correct buccolingual relation. The principle of again employing this mass anchorage against one tooth made it possible to accomplish this without disturbing the positions of the anchorage teeth which we did not wish to alter. After this was accomplished, the band on the second right maxillary molar was removed, and a band fitted to the maxillary first right molar, a new lingual arch inserted and an auxiliary spring attached to move the second

right maxillary premolar to its correct buccolingual relation. (Fig. 8.) As soon as this was done, the cross-bite condition of the case might be considered satisfactorily corrected. This is one of the methods I have been using in the treatment of cases of this kind. It should be stated here that while these movements were taking place in the maxillary teeth, a labial arch was inserted on the mandibular teeth from molar to molar to prevent any movement of these which might be produced by the forces of occlusion due to the intercusping of the maxillary teeth while they were in a state of transition. The next phase of the case was then considered.

In my introductory remarks I stated as a third general principle never to undertake changes in the teeth or changes in the relationship of the jaws without due consideration for compensatory and complementary movements in the opposite jaw. If this principle is employed in cases of unilateral distoclusion, much of the grief with which these cases are accompanied will be found to be eliminated. While the case was being treated for the condition of cross-bite, the maxillary left canine was moved buccally, for purposes of additional anchorage, and because the first step of getting the patient to place the jaws in as near the position of normality as possible disclosed the fact that this was one of the teeth which was interfering with the ability of the patient to do so comfortably. At this point the interference of this particular tooth was eliminated, and the next step was to move the maxillary left premolars buccally and institute the use of intermaxillary elastics. A lingual arch with a recurved auxiliary spring was used on the left side to move the left premolars buccally. In previous articles I have advocated the use of round tubes in lingual anchorage for several reasons, one of them being the particular benefit which they produce in cases of this kind. The extensions on the lingual arches are capable of rotating within the vertical tubes. The auxiliary spring against the premolars exerted pressure against these teeth, reciprocating this pressure backward against the extension which fitted in the tube on the right molar band, distally, producing this effect on that tooth. This, combined with the force of the intermaxillary elastics, hastened the movement of the tooth distally. At the time the use of the intermaxillary elastics was started the use of the mandibular labial arch was discontinued and a mandibular lingual arch inserted in its place. It will be noted that in the original models the mandibular right first premolar was somewhat in linguoversion. This tooth was moved buccally by means of a lingual auxiliary spring, and several other minor changes were effected which will be noted in a comparison of the original models with those taken after treatment was completed. The maxillary incisors were moved lingually by means of labial auxiliary springs, and while the intermaxillary elastics were being used, the labial arch was stabilized by tying it to a bracket hook soldered to a band on the maxillary right first premolar. This method prevents tipping, to a certain extent, of the molar carrying the band, and in most cases produces an elongation of the premolar which has a tendency to shorten the overbite and produce a more satisfactory vertical arrangement of the teeth in the production of that mythical curve known as the curve of Spee.

In this particular case, the patient had to go to college before I had completed some of the final minor adjustments which I should have liked to produce to obtain the very best rearrangement of the teeth which I consider desirable. At the point where I discontinued the active treatment, I inserted a modified Hawley retainer which I have described in previous articles,[1] and after two years there has apparently been no relapse. A photograph of the patient at the present time is shown in Figs. 9 and 10. In the treatment of this case I did not use gnathostatic methods. My clinical observations have shown me that in cases of cross-bite the facial asymmetry can become very pronounced if this condition is left untreated and that after treatment is completed and a new anatomic relation and muscular function are established, this asymmetry disappears more and more as the new function naturally tends to change the complete orientation of the denture to the skull. This undoubtedly is of a very complex nature and might be studied with great interest from at least an academic standpoint with the appliance with which Dr. Broadbent

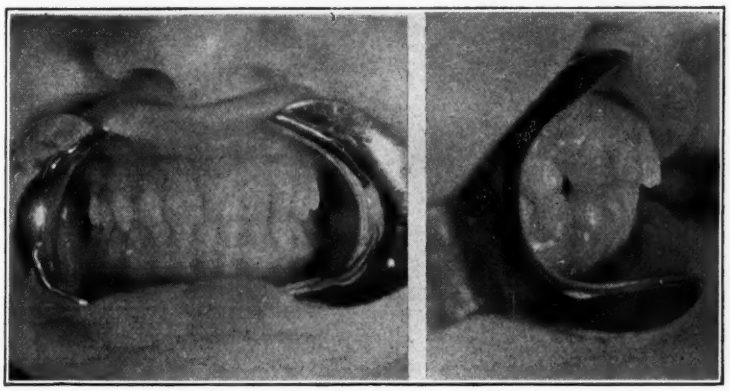

Fig. 9. Fig. 10.

has been working. Just what the correct orientation of the denture to the skull should be for each individual case I do not think has as yet been satisfactorily defined or proved by any one either in or out of the profession. There are so many factors which are entirely peculiar to the individual which must be considered that I much prefer to follow the dictates of my own observations, as the treatment progresses, than to hold myself bound to any landmarks which are in a state of constant flux, not only during the course of treatment but also during the entire lifetime of the individual.

Figs. 11 and 12 show the occlusal views of the case before and after treatment, and Fig. 13 shows the form of modified Hawley retainer which was used not only to retain the case but also to produce the final tooth adjustments and establish the correct jaw relations. Since my description of the construction of these retainers I have made several improvements. I have been using vulcanite very largely for the bite planes and am constructing the removable metal part in two separate halves, uniting them only by soldering on the labial surface after each half has been properly fitted. I have also adopted Dr. Lowrie Porter's method of bending the wire to cross the line of occlusion

Fig. 11.

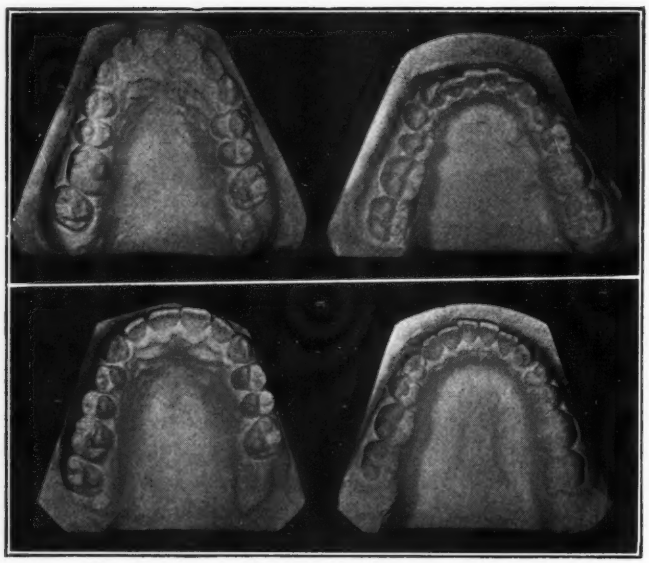

Fig. 12.

Fig. 13.

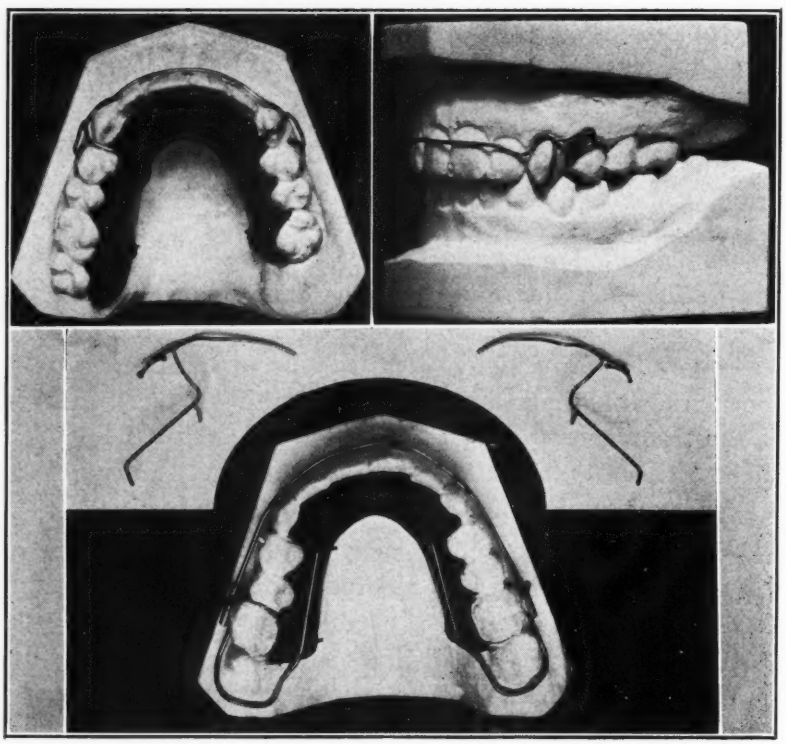

Fig. 14.

at the most advantageous point which does not interfere with the occlusion. It will be noted that on the left side of this case it happened to be over the point of the cusp of the left canine. The fact that the gold sections can be removed and altered at will, I have found to be of inestimable value.

Fig. 14 shows another use for the vulcanite bite plane retainer. It will be noted that this is used in combination with the fixed labial arch and held firmly in position by extensions which fit into the gold vertical tubes and bent to circle the second molars and around to the buccal surfaces of the first molars. The free ends are bent to fit over the buccal tubes on the first molars with a slight pressure downward.

This retainer can quickly be converted into the modified Hawley retainer by replacing these extensions with the labial modification. The two labial separate halves are shown in Fig. 14.

I am quite certain that the method of mental approach and the mechanical devices used in the treatment of the case which I have described will not meet with the approval of all orthodontists, but I shall close my remarks with a quotation from an essay by Sir Arthur Keith in his contribution to a book on *Living Philosophies,* "As long as man remains an inquiring animal there can never be a complete unanimity in our fundamental beliefs."

REFERENCE

1. Jackson, A. F.: Dental Cosmos, October, November, December, 1931.

SOME CASES OF LINGUAL RELATIONSHIP OF MANDIBULAR MOLARS*

F. St. J. Steadman, M.R.C.S., L.R.C.P., L.D.S., London, England

Case 1.—(*By courtesy of Mr. V. A. F. Greenish.*) R. L., aged seven years three months. Past history—*Medical*—Measles at two and one-half years. Tonsils and adenoids removed at the age of three years. Whooping cough at five years. Slight attack of bronchitis early this year (1932). *Dental*—The right second deciduous molar was removed January 7, 1929. The left lower deciduous molars were removed for advanced caries, March 31, 1930.

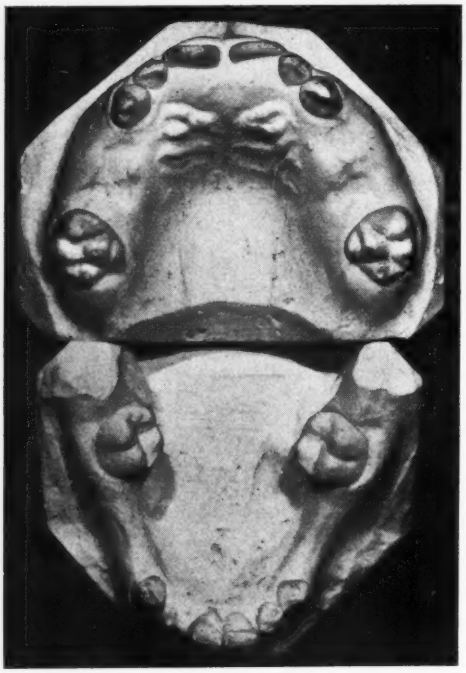

Fig. 1.

The condition as seen on October 12 of this year: Several carious deciduous teeth present with sinuses discharging pus. The maxillary incisor teeth have erupted inside the mandibular incisors. The first two mandibular permanent molar teeth are tilted lingually to such an extent that they do not occlude with the maxillary teeth. The mandible gives one the impression of being too narrow for the maxilla. Although this apparent narrowing of the mandible is marked when one looks at the models of the case, yet looking at the photographs the jaw does not look markedly so. There seems to be a slight suggestion of

*Transactions of British Society for the Study of Orthodontics, 1932.

heredity in this case, as the mother's left second molar is also tilted lingually. (Figs. 1, 2, 3, 4 and 5.)

Fig. 2.

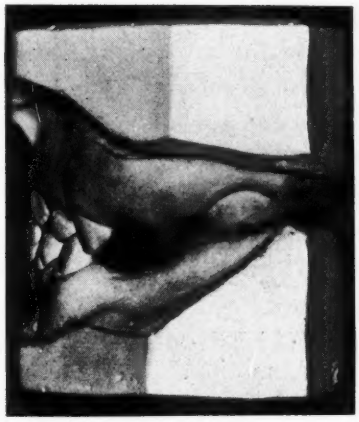

Fig. 3.

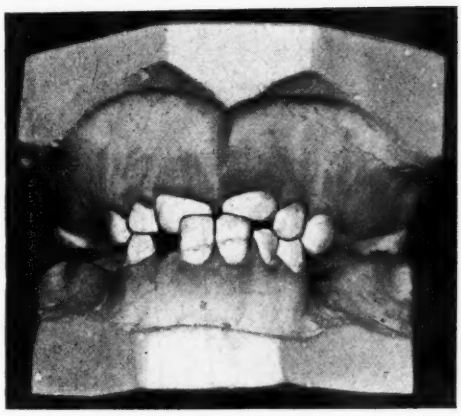

Fig. 4.

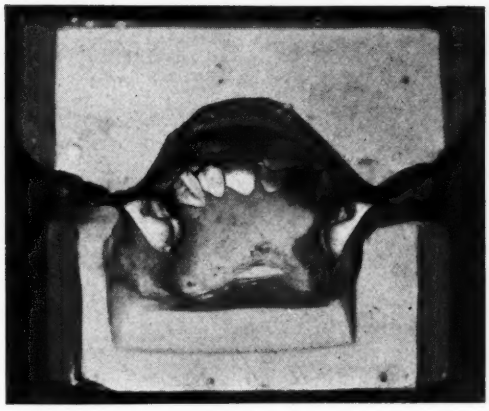

Fig. 5.

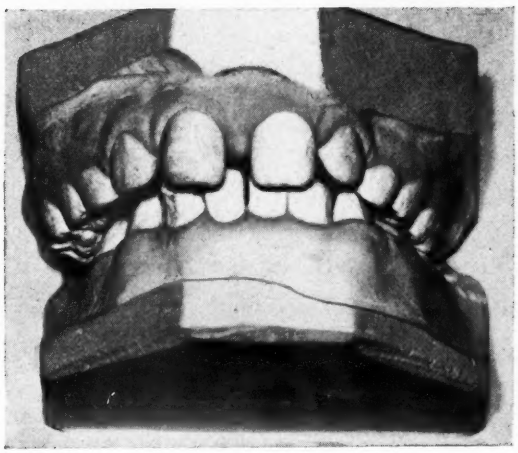

Fig. 6.

CASE 2.—O. C., aged ten years two months. There is nothing unusual in the past medical history of this patient. The four permanent first molars, together with the second deciduous molars were removed September 10, 1931.

Present condition: On the right side the whole of the maxillary teeth are situated outside the mandibular teeth. One cannot use the word occlusion here, for they do not occlude. It is interesting to note that the deciduous teeth are present and occupy this position, and that the second permanent molar is erupting outside the arch on the right side in the line of the deciduous teeth. The mandibular premolars have moved backward owing to the removal of the first permanent molars fourteen months ago (Fig. 6).

The interesting point to consider is the cause of these irregularities. I could find nothing in the literature to give any information which will help us here. Many evils are ascribed to the early removal of deciduous teeth, but I do not think that this can have influenced the condition in either case.

In Case 1, the only explanation I can think of is that the mandibular permanent molars were formed in this position in their crypts and erupted in the line of their formation. It will be very interesting to note whether the premolars and the molars erupt in a similar manner, but this explanation, if it be correct, will not account for the apparent narrowness of the mandible.

SOME CASES OF LINGUAL RELATIONSHIP OF MANDIBULAR MOLARS*

Miss K. C. Smyth, L.D.S., London, England

Case 1.—D. B., aged four and three-fourths on September 13, 1932; models made September 13; photographs taken November 2, 1932. All deciduous teeth are present, no caries and only one filling.

Fig. 1.

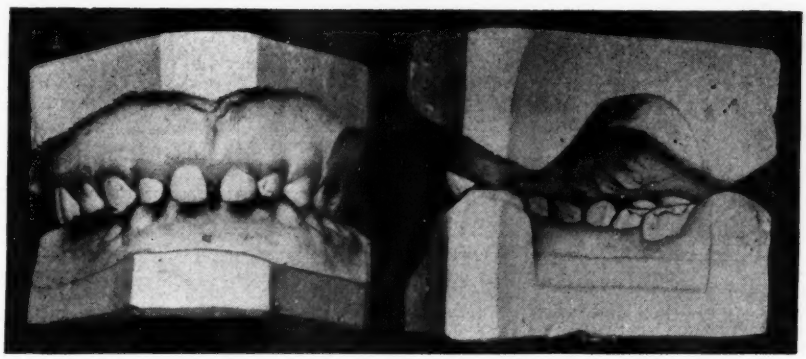

Fig. 2.

The anteroposterior relationship of the mandibular arch to the maxillary is definitely postnormal on both sides, and profile photographs show this (Fig. 1). The natural position of the lower lip is between the maxillary and mandibular incisors at all times, though the upper lip almost covers the maxillary incisors when the child is not smiling or talking.

*Transactions of British Society for the Study of Orthodontics, 1932.

On the left side the transverse relationship of maxillary and mandibular teeth is correct, but on the right both mandibular molars occlude completely lingually to the maxillary molars (Fig. 2).

The center line shows no deviation. The mandibular arch is definitely flattened on the right side. There is absolutely no history of thumb-sucking or any habit which might account for the deformity. The mother is very definite about this.

Treatment was started November 2 and at present is directed toward expansion of the mandibular arch by means of a lingual arch, to be followed by intermaxillary treatment.

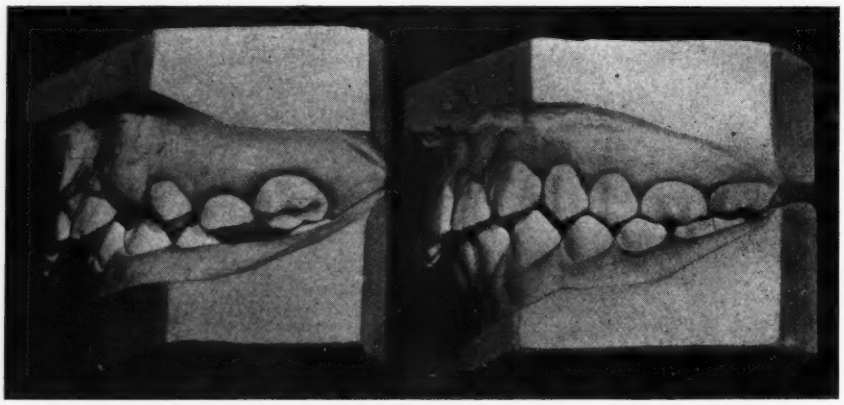

Fig. 3.

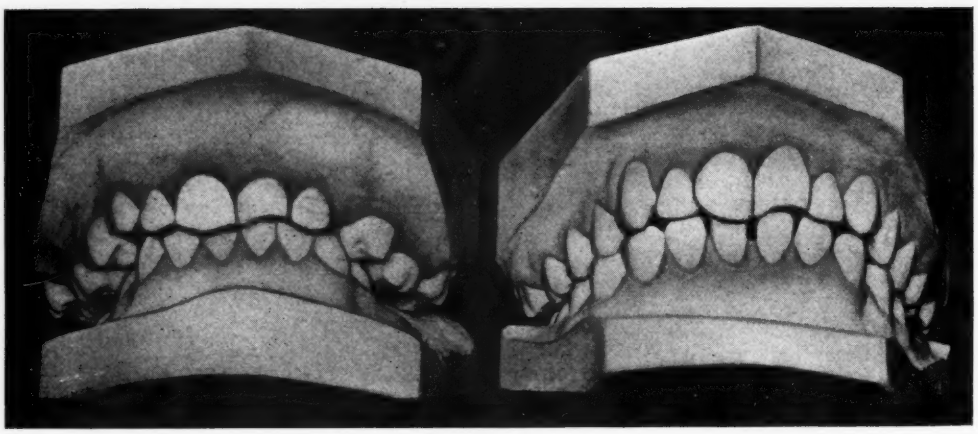

Fig. 4.

CASE 2.—R. R., aged twelve years in October, 1932; first models taken in April, 1930; last models taken in August, 1932. (Each figure, for convenience of comparison, has similar views of models before and after treatment.)

This patient was brought for treatment because the boy took about one and a half hours to eat each meal. He was then ten and one-half years old.

The arch relationship was postnormal (Fig. 3) on both sides, and both mandibular first permanent molars and mandibular first premolars were in complete lingual relationship to the maxillary arch (Fig. 4).* The second pre-

*The difference in appearance of the maxillary incisors in these two models is due to the second one being made from a composition impression which shows some distortion.

molars had not erupted fully. The molars are tilted lingually to some extent (Fig. 5). The tongue was remarkably large, and lay completely over all the mandibular teeth, fitting inside the large maxillary arch (Fig. 6).

An earlier pair of models taken December, 1929, has been lent by Mr. Doubleday, who referred the case, and they show that the mandibular deciduous molars were in the same lingual relationship.

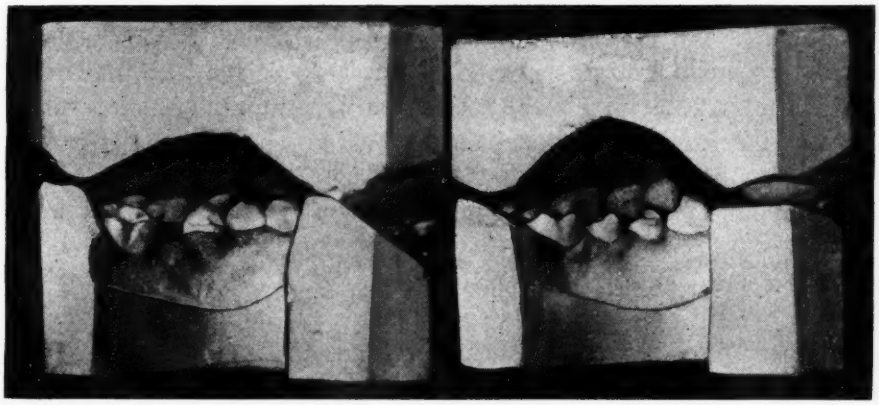

Fig. 5.

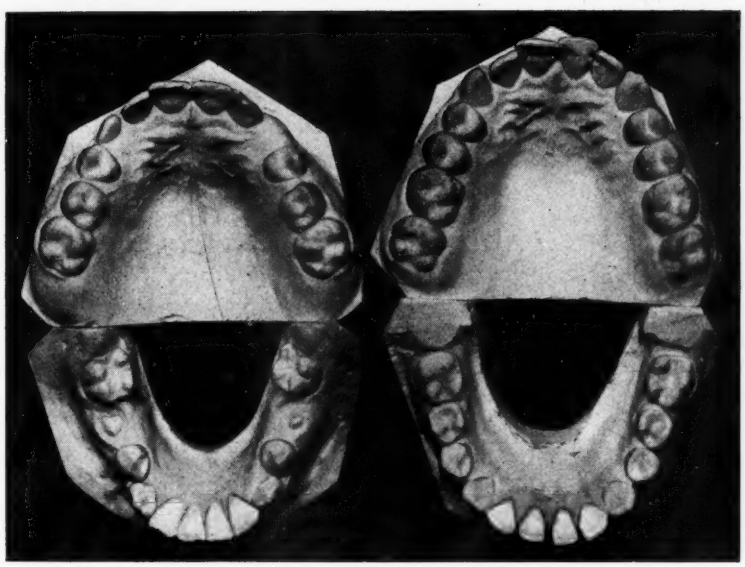

Fig. 6.

Treatment was directed toward the expansion of the mandibular arch, and a fixed appliance was made, with a U-loop in the center. The size of the tongue caused great difficulty in making the bands, and so much trouble was given by bands coming off owing to the cement washing away before it had set, that a Badcock screw-plate was used for a time. It was very uncomfortable owing to the narrowness of the arch, and as soon as the teeth were cusp to cusp it was discarded in favor of the original appliance, which could now be fitted more easily. After this stage the case progressed without difficulty; at the end of

about five months springs were used to move the mandibular premolars buccally. In January, 1932, the boy had good functional occlusion on either one side or the other, by swinging his mandible over. A buccal arch was used on the maxilla for a short time, with pressure in a lingual direction on the first molars, as it was considered that they had been displaced buccally to some extent; this hastened the improvement in molar occlusion considerably. Expansion was continued until the result shown in the final models was obtained, when a simple vulcanite mandibular retention plate was fitted.

Two features of the case were puzzling—the marked labial inclination of the mandibular incisors at the end of the treatment and the increase in the crowding of the maxillary incisors; both these were unintentional results, needless to say, and I should be grateful for suggestions as to how they came about. It had been my intention to treat the postnormal occlusion after completing mandibular expansion, but the circumstances just referred to had made this difficult, and after considering the boy's appearance which was good, and the fact that the occlusion is undoubtedly functional, I decided to leave the case alone for the present and watch for any change that might occur after removal of all appliances. I should be very glad to know the opinion of members as to whether this decision is a wise one or not.

MEASUREMENTS

	FIRST MODEL	LAST MODEL	DIFFERENCE
Breadth of Maxillary Arch			
Molars	54.5	51.0	–3.5
Premolars	40.0	39.0	–1.0
Breadth of Mandibular Arch			
Molars	40.5	49.0	+8.5
Premolars	30.0	36.0	+6.0

DISCUSSION

Mr. Doubleday said that as regards the etiology there were some interesting points. The boy was an only child of parents both of whom were unhealthy. The mother was an unhealthy woman, and the father had been an unhealthy man for many years and died suddenly during the present year. The child himself was born in China, and the early years of his life were spent there; so that his small stature and his lack of general growth were in part accounted for. Another interesting point was the lingual inclination of the molar teeth. He need not remind members of the Society of the work of Matthew Cryer, "The Internal Anatomy of the Face and Jaws," where he showed that in a patient who did not make functional use of the nose, the tongue, instead of exerting its internal pressure upon the arch, was back in the nasopharynx, and so allowed lingual inclination of the molar teeth. In this case, however, that did not appear to be true, because the tongue was large, and overspread the cheek teeth; and he desired to suggest that the large size of the tongue, and the fact that it was spread over the teeth, prevented it from exerting normal internal pressure on the arch, so failing to exert the pressure on the deciduous teeth and also on the alveolar process.

DEPARTMENT OF
DENTISTRY FOR CHILDREN

THE DEBATE OF THE CENTURY

Report on the Debate Between Two Prominent Teams on the Subject That a Clean Tooth Will Not Decay

EARLY in December, 1933, Dr. Thaddeus P. Hyatt repeated a challenge which he has made on several occasions, offering to debate with any one the question: "Resolved, that a clean tooth will not decay." Although this challenge had been made several times before, it was never accepted. On this occasion, however, it was taken up by Dr. E. V. McCollum, and two teams were chosen. The date set for the meeting was March 27, 1934.

The contending teams were as follows:

Affirmative	*Negative*
Dr. Thaddeus P. Hyatt	Dr. E. V. McCollum
Dr. Alfred Walker	Dr. Arthur H. Merritt
Dr. Maurice William	Dr. Weston A. Price

The Question:

Resolved: That a clean tooth does not decay and that mouth cleanliness affords the best known protection against dental caries.

Despite a cold, drizzly, blustery night, the Grand Ballroom of the Hotel Pennsylvania was jammed to its utmost capacity of about one thousand four hundred people. It was a keenly interested, nonpartisan audience, which quickly responded to the sallies of wit or well-made points from either side. It was hugely appreciative of the effect created when for some unknown reason the organ in the ballroom began to intone a solemn, hymnlike air in the midst of the opening speech of the presiding officer, Dr. Carroll Whitcomb.

In opening the meeting Dr. Whitcomb mentioned that the slogan "A clean tooth will not decay" was first used by Dr. J. Leon Williams, and that both sides had the greatest respect for the value of mouth hygiene, "Dr. McCollum feeling that the best interests would be served by accepting the challenge." Dr. Whitcomb then announced the rules of the debate, and called attention to the fact that in order to avoid any hair-splitting in the matter of definitions, or misunderstanding, it had been decided that by a "clean tooth," should be understood "a tooth kept as clean as the ordinary individual can

do so with proper mouth toilet." There was no jury, and no decision was to be made, as a verdict might put one side or the other in a false light. The three men for the affirmative were to speak first, each man being allotted fifteen minutes. The speakers for the affirmative were introduced by the president of the Second District, and those for the negative by the president of the First District.

A tremendous thunder of applause greeted the first speaker for the affirmative—Dr. Hyatt. Speaking easily and with all the jaunty, self-possessed manner of the man well accustomed to the platform, Dr. Hyatt propounded two axioms as the foundation of the platform for the affirmative, namely:

1. Dental decay always starts on the *outside* of the tooth.
2. The presence of bacteria is necessary to produce decay.

These points were enlarged and supported by numerous quotations from prominent authorities in dentistry. He further stated that saliva was never sufficiently acid to produce decay, and he emphasized the fact that if it were, it would affect all surfaces of all teeth equally, whereas dental caries is largely confined to specific locations. He closed with a summation of his points.

Dr. Walker was the second speaker for the affirmative, and called attention to the fact that he purposely refrained from all technical language for the benefit of any in the audience who might not be dentists. He said, in part: "It is not our intention to attempt to solve the problem of tooth decay. I know of no measure to absolutely prevent dental decay, but decay does not occur where a tooth can be kept clean. In the absence of faults, the buccal or lingual surfaces do not decay." He then pointed out the fact that a rotated tooth will decay on its rotated approximal surface even though that surface was its anatomic buccal or lingual surface which ordinarily would not be subject to caries. Another point well taken was the fact that decay must start from without or else the filling process would be useless. He also asked why, if internal influences were the causative factor in caries, the lingual surfaces of the mandibular anterior teeth were not affected to the same degree as other surfaces of other teeth. His paper was very well presented, dignified, to the point, and was well received.

The third speaker for the affirmative was Dr. William. Dr. William introduced the matter of systemic diseases arising from neglected dental caries, but on the whole his paper was too facetiously presented to carry much if any weight, and his points were not clear-cut or well made.

Dr. McCollum led the attack for the negative. In answering a statement by the affirmative that pits and fissures were simply traps to hold bacteria, Dr. McCollum said: "Why set these traps in the first place?" He said that the affirmative dealt only with the present; whereas he looked to the infant just beginning life. He pointed out that a perfection of bodily chemistry should produce the optimum of protective efficiency, and that there is a protective mechanism which tends to safeguard teeth from decay. He especially stressed the value of vitamin D. He said that there "was a calcifying diet,

and that Mellenby, Boyd, and Drain were experimenting along these lines very successfully. His presentation was excellent, dignified, forceful, and very well received.

Second for the negative was Dr. Merritt. Dr. Merritt called attention to the fact that there were certain individuals who, despite our best efforts, continued to show extensive dental decay, and that with all our operative measures we could not show any reduction in the incidence of decay. He also stated that "Cleanliness is merely relative, and not permanent." He quoted Dr. Bödecker's article in which the teeth of Indians were shown which had not decayed despite the presence of pits and fissures. His principal point seemed to be that we have been giving too much credit to mouth hygiene, when it might better have been given to immunity. Again he pointed out that in Honolulu severe dental ravages in certain children had been entirely brought under control through a change in diet. He likewise called attention to the work being done at Columbia University by Dr. McBeath in the use of the ultraviolet ray; children exposed to this treatment had eight times less dental decay than did the control group not so exposed.

Dr. Weston Price swung into action as the "anchor man" with all the power and oratory usually associated with this splendid speaker. He used slides to illustrate his part of the program, and rapidly but dramatically pointed out, with slide after slide, the absolute lack of dental caries in primitive peoples living on natural diets untainted by civilized refinements. He declared that dental caries was not a disease but a symptom. After showing slides of natives of the Hebrides, the Swiss, Indians, and Eskimos, he stated that with only one protective meal a day, for six days a week, he had been able to change the incidence of decay of children without having to change their other meals at all. His presentation was of the type which naturally won his audience.

In rebuttal, the negative gave the first presentation. Dr. McCollum, speaking first, stated that the affirmative had entirely overlooked the fact that children averaging three new cavities per year when in an orphanage under strict dietary rules averaged less than 1.5 new cavities, and when exposed to the influence of vitamin D the increase was reduced to 0.69 cavities per year. He then made the following suggestion: "The old slogan should be changed to read that—A clean tooth which is perfect in structure, well exercised, and well nourished will not decay."

Second for the negative was Dr. Price who once more stressed the value of the cleansing and protective action of saliva. He said in refutation of Dr. William's statements about infections of the teeth that primitive peoples have no word for arthritis, for instance, because they do not have it. He said that the dental profession had failed because it had thought only in terms of mechanical procedures instead of dynamic measures of healthy living.

Each of the men for the affirmative took part in the rebuttal. Dr. Walker pointed out the fact that Dr. Price had shown fillings which had been put in the cavities of teeth which he claimed were being protected by action of the saliva, and then demanded to know how the saliva could get into that cavity

to protect it if it was filled. Dr. Hyatt undoubtedly scored the best point of the entire rebuttal for either side when he produced a list of thirty foods, published by the Mayo Clinic, which were causative of indigestion and in some cases were actually poison. They included foods such as onions, apples, oranges, chops, etc. In summing up, Dr. Hyatt cried, "What in Sam Hill is left for a man to eat?" Incidentally, the negative failed to disprove the two original points made by Dr. Hyatt, namely, that dental decay always starts on the outside of the tooth, and that the presence of bacteria is necessary to produce decay.

The most noteworthy things in this entire program were the splendid spirit and the keen enjoyment with which both the participants and the audience entered into the debate. It was a splendid example of what sincerely interested professional gentlemen can do to promote interest and greater knowledge in both sides of a subject which cannot be separated—one side from the other.

H. D. S.

PREVENTIVE DENTISTRY IN PUBLIC HEALTH*

Its Relation to Private Practice

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IN REVIEWING the literature, it seems to make no difference whether Lithuania, England, the United States, or Los Angeles is the geographic area under consideration, the problem of providing dental care for the masses is ever present. Granting that a large percentage of the world's population suffers from dental disorder, either directly or indirectly, and that something needs to be done about it. Are we going to be satisfied in directing all our thoughts on already existing deplorable conditions, thereby offering no solution to the problem of mouth health of future generations? We have to meet the present condition, that is true; but while we are discussing socialized dentistry, panel dentistry, state dentistry, health insurance, and all the other schemes which make many dentists' hair stand on end when they hear the term—without exactly knowing why—very little thought is given to how the most widespread disease of mankind can be *prevented.* If schemes were proposed to direct attention to the maintenance of health by preventing disease from developing, the benefits would be far reaching. If such a scheme were put into effect, the necessity for socialized dentistry would be on the decline during the span of one generation. We would be starting with the horse and not the cart, at the same time answering the call of mankind.

There has been considerable comment lately about the evolutionary change of the dentition of the human race of civilized countries, due mainly to the concentrated, soft, pappy foods which require no chewing. In other words, it is anticipated that with the decreasing need for teeth nature will refuse to develop them; then what would the dentist, as well as the people, do? Dental progress would cease and retrogression would follow.

Scientific research and ordinary observation have shown the medical and dental professions that many of the general systemic diseases are, without a question of a doubt, caused by focal infection from diseased mouth and throat conditions. Prevention will promote the health of the people and give us a race of strong, sturdy, robust individuals.

Technically, the dental profession is called upon to develop intricately designed pieces of apparatus which frequently would require the ingenuity of skilled engineers; yet, what have we when the restoration is beautifully finished, mechanically correct, and so far as possible meets the needs of the patient? To begin with, the dental arch is badly crippled, because of missing teeth which probably will have to be reconstructed again in a few years.

*Read before the Alumni Association of the College of Dentistry, University of Southern California, Feb. 7, 1934.

Financially, the patient does not begin to receive the return on the money invested that he would had preventive measures been followed throughout life. The dentist does not make the profit on complex replacements that he does when his time is devoted to preventive dentistry. There are definite figures which show that the financial outlay for operative dentistry returns to the dentist a much larger percentage than does any form of prosthetic dentistry.

A competent authority estimates that it would cost no more to serve a child adequately rendering a preventive service from the age of two and one-half to eighteen years inclusive than it would to put the eighteen-year-old freshman's mouth in passable condition through extensive repairs, to say nothing about the contrast in terms of health, freedom from pain, and all the other attendant handicaps, as well as the prognosis for the future. A manufacturer given the choice of putting on the market a superior article with no increase in the cost of production would not hesitate one minute.

You ask—What is preventive dentistry? For the broad thinking person, all dentistry is preventive because every type of dentistry prevents something, either temporarily or permanently. For example, the placing of a large gold inlay in a tooth which has suffered the ravages of carious processes, prevents pain; the possible death of the pulp; the formation of an abscess with resulting rheumatism, heart complications, and even the possibility of contracting a communicable disease through lowered resistance; it also prolongs the life of the tooth.

The White House Conference reports of the meeting called by President Hoover in 1930 quote from an unpublished report of Dr. Arthur D. Black's on the causes of death—when arguing for the incorporation of dental records in vital statistics for studying the relation of oral disease to the causes of death, states:

"In the light of better knowledge of health and disease in recent years, it is necessary that we change somewhat our conception of the causes of death. It is customary to say that a person died of a particular condition or disease, when as a matter of fact the real cause might often be located years previously in the life history of the individual. A particular disease, as pneumonia, may be listed as the immediate cause of death, although the physical condition of the person, which permitted him to take pneumonia and succumb, may have been a long standing chronic infection which had attracted little attention.

"It might be well to compare for a moment those diseases that kill directly and often very quickly with those that impair health and efficiency and on the average shorten the span of life. Prevention of diseases of the first group, such as cholera, yellow fever, and smallpox is appalling and spectacular; prevention of the latter group to which chronic mouth infections belong creates no excitement because the beneficent effects can never be fully realized. In fact, the original cause may not be recognized. A person with

an abscessed tooth may develop an infection of a kidney; he may be at first slightly and then gradually more incapacitated for work, later an invalid for a long time and finally die. The effect is spread over twenty-five years or more, and the original cause has long been forgotten, if it is ever known. On the other hand, in the same case, if a dentist had extracted the abscessed tooth and thus prevented the kidney infection, he would receive no credit for having possibly extended the individual's period of usefulness and also for having prolonged his life.

"The appalling prevalence of mouth infections should impress the fact that there is no more urgently needed service bearing upon the health of our people than the development of means of prevention."

Charles H. Mayo of Rochester states that "80 per cent of all children's diseases arise in the mouth, nose or throat, and that 90 per cent of all deaths occur as a result of diseases that arise in this area or of the development in other parts of the body of diseases that have their origin in the nasal or oral cavities."

Life insurance companies have always been obliged to attempt in every way possible to prevent, or at least to postpone, the dire event—death—against which they insure. Their experience has been that large numbers of people died long before their time. Side by side with life insurance, the public health movement grew up and proved that these premature deaths from many causes were preventable. A large percentage of the deaths that occurred in infancy and early childhood happened needlessly. As long as twenty-three years ago, Dr. Frankel conveyed this knowledge to the president of the Metropolitan Life Insurance Company, today the main insurance company which follows the principles of *public health.* This organization is literally a business organization engaged in private public health work, the success of which depends upon its campaign to prevent disease, to lengthen the span of life, to decrease dependency and generally to make life easier for the people.

The Metropolitan Life Insurance Company in New York City engages some 12,000 employees. A staff of dental hygienists, under the direction of Dr. Thaddeus Hyatt, examines the mouths and gives prophylaxis to the employees twice annually. Employees are required to go to their private dentist for the restorative work.

Many industrial organizations in the United States provide some sort of dental service for their employees. Certainly private enterprise would not concern itself with supplying dental care unless it were economically profitable. This must likewise apply to the public.

About fifteen or twenty years ago in the United States, preventive dentistry came into its own. Many demonstrations were started which confined their activity to the school child. Undoubtedly, the fact that children were congregated in groups, thereby more easily reached and supervised, influenced the adoption of the school age. From a modern public health point of view, namely, the promotion and conservation of health both of individuals and of

communities in order that the community be a better place in which to live, the school age does not reach children early enough to give the full value of preventive measures.

Programs were started at the four corners of the world for dentistry for school children. In 1913, A. C. Fones, in Bridgeport, Connecticut, developed the dental hygienist movement. Young women were trained to inspect the teeth of school children, to give classroom talks on the benefits of mouth hygiene, to give prophylaxis to demonstrate the value of clean teeth, and to give toothbrush drills.

In 1915, Fones originated clinical service for the correction of small cavities in first permanent molars of the first and second grade children. That year, fifth grade children lost 15.1 per cent of their first permanent molars. Five years later the fifth grade children lost 7 per cent of their first permanent molars, which showed a reduction of 49.6 per cent in incidence of dental caries. This decrease was unquestionably brought about by the concentrated effort of the dental hygienist and attention given small pits and fissures five years previously.

In 1921, at the expiration of the five-year demonstration, the board of education passed a resolution requiring children to have dental corrections made. They report a saving in actual cash to the taxpayer of 25 per cent of the school budget brought about by the proper care of children's teeth. This saving more than paid for all their health educational work which lowered the death rate of the children from diphtheria from 38 to 18 per cent, measles from 20 to 4 per cent, scarlet fever from 15 to 5 per cent.

Dr. Fones estimates that "Every dollar spent for health through prevention, means a saving of $50.00 spent for treatment of disease in addition to the continuance of the efficiency and happiness of the individual."

The schools of Atlanta, Georgia, have made an outstanding demonstration by only the introduction of a dental service. In 1924, 32 per cent of the children failed to pass their grades. At the end of one year's dental service only 8 per cent failed to pass. Before the dental program, the average daily attendance was 83 per cent, at the end of the year the average daily attendance increased to 97 per cent, which represented a saving of from $12,000 to $48,000, according to the estimated cost of each school day per child in the United States.

P. G. Puterbaugh, D.D.S., in a radio broadcast, made the statement that the average number of retarded school children in the United States is 40 per cent of the school population. Chicago spent $3,240,000 in 1928 in teaching children who were repeating their grade. It was thought that poor health, much of which was traceable to bad teeth, was the cause of the high percentage of so-called repeaters.

In California in 1924 it was estimated that it cost the state $4,997,000 for 60,000 repeaters.

Several years later the well-planned demonstrations had proved the economic value of dental hygiene by improving both the physical and the mental conditions of school children.

Cleveland has observed that it costs five times as much to give dental care to thirteen-year-old children as it does to six-year-old children. Therefore, a given sum could care for five pupils at the age of six years and prevent their becoming a problem at thirteen years of age.

Quoting from the United States Public Health Service Bulletin, Reprint No. 622: "As a matter of dollars and cents, mouth hygiene offers splendid returns for each dollar expended in the better growth and development of the children and by assuring better physical types."

Boards of education were the first to appreciate the need of preventive dental services because of the high incidence of dental caries among school children. After several very startling oral hygiene demonstrations had been completed, it was learned that there was an economic value as well as a health factor. Child health being a recognized function of public health and it being impossible to segregate dental health, the responsibility has been largely delegated to public health departments. Public health departments are not handicapped by age limits. They prefer conducting preventive services for infants and preschool children in order that these children may enter school in good physical condition and having received protection against communicable diseases to which children are quite susceptible.

The value of a preschool oral hygiene program is many fold. The child becomes "dental conscious" during the impressionable period. He develops the habit of mouth hygiene and periodic visits to the dentist while young enough to accept these acts as matters of everyday routine. He has never known differently.

In the past, dentists were more afraid of small children than the children were of the dentists. Because of the manner with which the dentist approached the little patient, namely, extreme enthusiasm to gain confidence, the child immediately became suspicious as this attitude was different from any of the contacts of his experience. Then the child cried, became restless, wanted to go home, wanted a drink, and the dentist had to think up all sorts of things to combat this attitude. The result was misunderstanding and confusion. All of this could have been avoided if the dentist had regarded the child as an individual and started out by being friendly and frank, and talking about airplanes, trains, dolls, dogs, blocks, and other things in which all children of various ages are interested.

This paper does not deal with child psychology, therefore let us get back to the advantages of preventive dentistry during the preschool period. The Children's Bureau in Washington established the preschool period as from one to five years of age inclusive. During this period, when permanent teeth are developing within the dental arches and the deciduous canines and molars are completing root development, it is essential that the parent receive educational instruction in proper diet, correct care of the mouth, including the kind and care of toothbrush and be taught the importance of periodic supervision at least every six months, better still every three or four months, since defects in deciduous teeth develop rapidly. Frequent visits to the dentist re-

sult in the detection of small pits and fissures which must be filled while still small, the benefits of which are obvious. By using every method possible for reaching the preschool child and getting him under supervision before the eruption of the first permanent molar and maintaining regular examination, prophylactic treatment and correction of small pits, the child is carried through the entire eruption periods of both the deciduous and the permanent teeth.

In some of the European cities the government compels dental examination and correction of defects of school children. At Glasgow Sheriff Court in Scotland a parent was charged with neglecting his child by failing to have certain decayed teeth extracted. The parents had received warning from the educational authority that in the opinion of the school medical officer the condition of the child's teeth was causing suffering and injury to the child's health. The parent refused to provide dental treatment and declined to allow the educational authority to provide the necessary care. The sheriff imposed a fine of five pounds or ten days' imprisonment.

The Pennsylvania legislature requires that any child who is obliged to go to work before sixteen years of age must pass a physical examination and that no child with more than two carious teeth shall be granted a working certificate until the proper dental service is rendered.

Early in 1920 the commissioner of health in Pennsylvania, at the request of prominent members of the dental profession, obtained a five months' lease of a motor dental clinic for demonstration purposes only. In two years every one of the fourteen communities visited during the demonstration had inaugurated a dental health program supported by local tax funds.

In 1921 the dental division of the state department of health was created. The chairman of the Committee on Mouth Hygiene and Public Instruction of the state dental society is also the director of the state dental service.

There are now twelve states that have full-time dental workers. In New York the service is under the department of education. The states having oral hygiene service under the department of health are Iowa, Michigan, Pennsylvania, North Carolina, Oklahoma, South Carolina, Virginia, Maine, Massachusetts, Connecticut, and Mississippi. California does not have an oral hygiene program under any state department.

Preventive dental service in Los Angeles County is rather unique in that it favorably compares with the standards of large cities, which are higher than those set up for counties.

The oral hygiene program consists of an educational one in the schools and is conducted by dental hygienists. They examine mouths and send home reports of findings, give classroom and P. T. A. talks, toothbrush drills, and organize clubs and campaigns for the purpose of interesting all children in mouth hygiene.

The preventive dental service carried on in twelve major health centers in Los Angeles county, exclusive of Los Angeles city, Pasadena, and Long Beach, function half time (four hours daily). The service offers examination

and educational instruction for pregnant women during the first four months of pregnancy, children through the first grade (second, third, fourth, etc., grade children are admitted on a sliding basis when time permits), and contacts of tuberculosis up to fourteen years of age. Patients are referred by health center services, schools, private physicians and dentists, and self-application.

Preventive dentistry for the preservation of normal dentition, an important factor in public health, is provided when the above groups cannot afford private care.

Periodic supervision is maintained every four months for all patients admitted for preventive dentistry for the detection of developing abnormalities and the prevention of dental defects which result in focal infection. This service continues until children are fourteen years of age, if they cooperate, or until the case is closed. First application must be made before the maximum age limit for new cases. (Note policy for examination and educational advice above.)

Diagnosis of Vincent's infection, instruction for home care, and an initial treatment are offered all suspected cases on the basis of a communicable disease. Treatment is continued for patients unable to afford private care, until the infection is negative.

The title to this paper is "Preventive Dentistry in Public Health; Its Relation to Private Practice."

The question may be asked, how does this all relate to private practice?

First, mass education of school children emphasizes the value of routine supervision and urges all children in need of care to visit their family dentist.

Second, leaflets and information are carried home by the children.

Third, examination and educational instruction are given any one of the groups above mentioned regardless of financial status. The primary function of this service is to impress parents with the importance of proper diet, of routine supervision, and mouth hygiene.

Fourth, operative dentistry and periodic supervision are provided only when according to the findings of the medical social worker the patient cannot afford the services of a private dentist.

The following recommendations are made, the development of preventive dentistry by the trial and error method having been taken into consideration, resulting in definite objectives:

First, that a preventive dental service be incorporated in the state department of public health, the function of which would be to study services operated locally either by boards of education or by health departments—and develop standards and policies for providing preventive dentistry for children.

Second, that local health departments conduct preventive services for beginning prenatal cases and preschool children with the hope that all children entering school will be under supervision of private dentists or health departments.

Third, that boards of education will continue preventive activities through the elementary school period by educational programs conducted by dental hygienists, and

Fourth, that periodic supervision will be continued by private dentists, schools, or health departments for those unable to afford private care.

Such state and local facilities would provide the benefits of preventive dental service from conception through the elementary school period; in other words, during the periods of development and eruption of deciduous and permanent teeth.

SHOULD THE DENTIST PRESCRIBE A DIET?

J. M. WISAN, D.D.S., ELIZABETH, N. J.

THERE has been much discussion concerning the prescribing of diets by members of the dental profession. Authorities both in the medical and in the dental professions have contended that dentists were not qualified to advise their patients concerning nutrition even when treating dental conditions. For instance, Dr. John Marshall[1] believes: "The prescribing of a diet must always be left to the physician."

However, there is a different concept coming to the fore. Many observers realize that if the incidence of dental disease is to be controlled and limited, the dental profession must assume the responsibility of providing means of prevention. For example, the researches of Mellanby, Howe, Boyd and Drain, McCollum, Bunting and others have indicated that faulty diet is a causative factor in dental caries. Therefore, the question arises, "What should be the attitude and practice of the dental profession in respect to the nutritional phases of caries therapy?

Before answering this question, let us consider the experience of the past in depending on the medical profession to provide nutritional measures for the prevention of dental decay.

The Report of the Sub-Committee in Professional Education Section of the American Dietetic Association[2] states:

"Of seventy-one medical schools responding to the questionnaire, only twenty-two offer formal courses in nutrition and diet therapy as a part of the medical curriculum.

"In only ten of these medical schools were courses in nutrition obligatory.

"It is almost universally conceded that the average physician's knowledge of normal nutrition and the method of modifying the normal requirements to meet the needs of the body in disease is extremely limited. We would recommend that these subjects (nutrition and diet therapy) be accorded a more important place in such curriculums (medical)."

Dr. R. M. Wilder, Chairman of Section on Pharmacology and Therapeutics at the Eighty-Second Annual Session of the American Medical Association in his address,[3] "The Significance of Diet in Treatment," expressed the following opinion:

"The education of physicians in nutrition is thus scarcely better than that of laymen. It comes largely from such interested sources as the circulars of commercial houses and the propaganda of purveyors of food.

"I regard it as extremely unfortunate that the average physician devotes so little time to the study of dietetics."

Further evidence of the lack of interest of the medical profession in this subject is obtained from an article by Dr. Marshall,[4] in which he states:

"That members of the dental profession have not received whole-hearted co-operation from their medical friends is basis for profound regret."

Dr. Wallace Seccombe, in a letter to me,[5] perhaps gives the reason for this indifference when he writes:

"From my own experience, I would say that physicians are not particularly interested in the preventive aspect of dental disease. Their own problems are of such magnitude that they find it difficult to keep up with the progress of medicine and have little time to devote to the development of dental health."

On the other hand, if we are to judge by the number of clinics and essays given before dental organizations on the subject of nutrition, we may be confident that many members of the dental profession are making heroic efforts to acquire knowledge of this subject.

Most dental schools are offering intensive courses, both graduate and postgraduate, in nutritional therapy. The faculty of the University of Toronto has compiled a comprehensive booklet entitled *Normal Nutrition* and the School of Dentistry of the University of Pennsylvania has recently published a Dental Nutritional Chart.[6] These are but two examples of the efforts of dental schools to make distinctive contributions to the subject of nutrition.

We may compare the interests of dentists with that of physicians in the nutritional phases of dental diseases, by reviewing the articles on this subject as listed in the *Quarterly Cumulative Index Medicus.*[7] The Index gives fairly complete listings of state and national medical journal publications, but presents rather incomplete accounts of dental journal articles.

In spite of this, for the years 1931, 1932 and the first three months of 1933 (January-March) the Index lists sixty-eight articles on nutrition related to dentistry—fifty-one in dental magazines and seventeen in medical journals. Of the seventeen published in medical journals, nine were written by dentists. Truly such data indicate that nutritional phases of dental diseases receive more attention in dental circles.

Dr. Charles Mayo paid tribute to the activities of the dental profession in nutrition when he reported that, "In the past two years, half of the papers written on the subject of nutrition have come from dentists."[8]

Are dentists qualified to prescribe nutritional treatment? Seccombe, who has had considerable experience in teaching dental nutrition to undergraduates, practicing dentists and physicians, stated:

"Regarding the knowledge of physicians upon the subject of nutrition in relation to the teeth, I personally believe that the average dentist is better informed upon this question than the average physician, as I believe he should be."[5]

After all, the prevention of dental disease belongs to the dentist; it is his problem. Is it not wise to assign the study of dental nutrition to those who make the treatment of dental disease their life work?

Is it not logical to assume that the doctor of dental surgery, who has a comprehensive concept of dental needs and the realization of the consequences of dental disorders, will devote the necessary study to become familiar with the science of nutrition as it affects his professional duties?

Accepting the premise that the prevention of dental disease is its responsibility, the dental profession should adopt the following measures:

(1) Give the students in the dental schools a thorough training in nutrition.

(2) Encourage the private dentist to become well informed on this subject.

(3) Present dental health information to the public.

It seems certain that the survey of the curriculums being conducted by the American Association of Dental Schools will result in dental schools answering the needs of the students.

As to the present-day practitioner, results will depend upon those who control dental society programs and the interest of the individual dentist in obtaining all available information.

The third recommendation—informing the public—bears particular significance, for the welfare of the public should be the major objective.

Individuals are seeking this information from dentists whom they hold responsible for the health of their mouths. Patients do not expect physicians to treat their teeth, but they do look to the dentist to enable them "to retain the permanent teeth, functioning adequately and with comfort."

The Progress Reports of the Curricula Survey Committee, submitted to the American Association of Dental Schools, are convincing testimony to the fact that the public looks to the dental profession for preventive knowledge. In a discussion of dental health needs and dental practice from the point of view of the layman, the following is reported: "One of the most significant features of the replies seems to be the feeling that the dental profession fails to give instruction relating to oral health."[9]

Evidence points to the necessity and ability of the dental profession to assume *full responsibility* for the improvement of dental health. The public expects us to carry on this work. Let us not fail them.

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SUBMERGED DECIDUOUS TEETH

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THE number of deciduous teeth found in a submerged relation to the adjacent teeth are comparatively few. They, however, are frequent enough to warrant consideration. The term "submerged" as it is employed here refers to an erupted deciduous tooth in infraclusion; a tooth that is suppressed or pocketed so that it is impossible to exfoliate. There may be a better word or terminology for such a condition, but this seems to cover the description and findings.

CLINICAL FINDINGS

This submerged condition usually seems to be in the mandibular arch and in the second premolar region. There may be a unilateral or a bilateral involvement. Few observations have been made of this condition in the maxillary arch. The cause may be due to the different curvatures of the arch. The mandibular arch develops into a slight concavity anteroposteriorly in its occlusal plane. The maxillary arch develops opposite to occlude with the mandibular arch. The range in the ages of these patients is wide. The usual age will be from nine to ten years and may run to the thirtieth or fortieth year.

The roots may or may not be fully or partially resorbed. If resorption occurs, there may be an ankylosis or what simulates an ankylosis, which in this case means the union of dentin to bone as described in Kronfeld's findings.[1]

The permanent premolar is present or absent depending upon the hereditary influences in the case. If present, it remains in the arch until the obstruction is removed. Often the tooth develops into a semihorizontal position or in a torsoclusion.

ETIOLOGY

The cause of this submersion may be related to a number of factors. Late retention of the deciduous second molars often plays a part. The roots often will not resorb, although the second premolar is in position. The rest of the arch will develop laterally and vertically to accommodate the larger dentition. The second deciduous molar remains in its original occlusal plane. The mesial contour of the permanent first molar may also be a cause. If it is somewhat bell shaped, the eruption of the second premolar may be withheld.

The early loss of the mandibular deciduous first molar allows the permanent first premolar to erupt before the normal time. If this tooth is bell shaped and erupts past the original line of occlusion, it may pocket the second deciduous molar. The tendency of the first permanent molar to move

mesially will aid in the pocketing. The rise of the tooth into the line of occlusion may continue until some opposing tooth is touched. If this opposing tooth is slow in eruption, the original occlusal plane of the mandibular teeth will certainly be raised. Should the second deciduous molar not raise, it will be subjected to submersion.

Mechanically raising the occlusal plane as in case of an extreme overbite could be the cause. When the first permanent molar is banded or crowned to open the bite, there is great danger in pocketing the second premolar. Consequently, an ill-fitting mesial portion of a band or crown could be the disturbing element.

PROGNOSIS AND TREATMENT

CASE 1.—A girl of fourteen years had been advised by a dentist to let the mandibular second deciduous molar remain in the arch (Fig. 1). Possibly he did not know it was a deciduous tooth. Fig. 3 is an x-ray picture in which it should be noted that the roots are fully resorbed from the coronal portion. Mesially and distally to the premolar root are two unabsorbed por-

Fig. 1.

Fig. 2.

Fig. 3.

tions of deciduous roots. It is obvious that without an x-ray picture these would have been left in the arch. This girl was advised to have the second premolar removed and a retainer placed in the space. The root-ends should be removed after the premolar has erupted. The patient could not afford a retainer but gave permission to have the case observed. In six months the tooth had moved up to the position shown in Fig. 2. Measurements were taken and it was found that the space had closed about 1 mm. in sixty days. The tooth had then erupted enough to hold the space and allowed it to come to its present position.

CASE 2.—Fig. 4 illustrates a similar bilateral condition in a young man twenty-one years old. He had never been advised to have these teeth removed. The family dentist had never suggested an x-ray examination. The patient

had experienced no pain or discomfort up to this time, nor nervousness and irritability. He was in good health.

X-ray pictures were taken of each side of the mouth, and the premolars were found to be present. No root remnants remained from the deciduous molars. The left second premolar coronal portion was tipped to the lingual, Fig. 5. The right second premolar leaned lingually and mesially against the first premolar, Fig. 6. The erupted first premolars in the mandibular arch both were buccal to the normal line of occlusion. The entire maxillary and mandibular arches were somewhat contracted. The patient was advised to

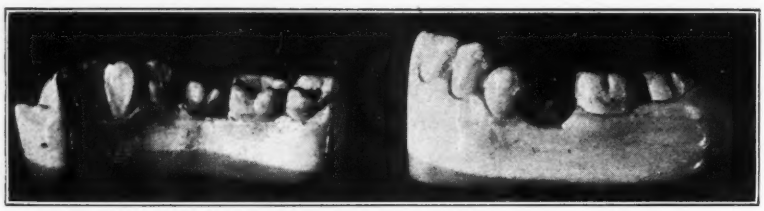

Fig. 4.

Fig. 5. Fig. 6.

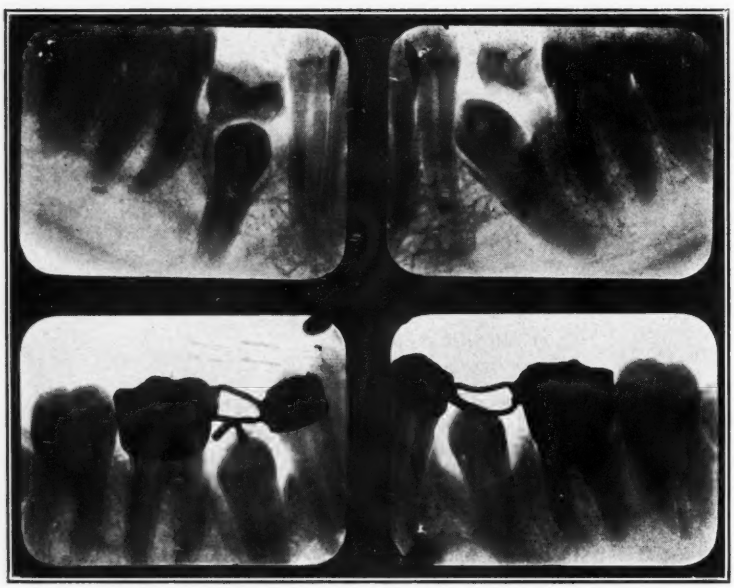

Fig. 7. Fig. 8.

have the deciduous teeth removed and some type of appliance placed to raise the premolars. The deciduous molars being removed, the permanent premolars would possibly erupt, but with some aid and guidance the case would be much more successful.

The ideal procedure would be to place an expansion arch with lingual finger springs pulling up the premolars slowly. The patient was a little old for this treatment and was in financial stress, but he felt the need of some type of service. The premolars and the first premolars were banded, and a twenty-gauge wire was soldered to them as shown in Figs. 7 and 8. The

premolars were exposed and a small pit cavity was prepared large enough in which to place a twenty-gauge gold post. This cavity was placed on the tip of the buccal cusp on the left side and in the distal pit on the right side. The posts were cemented in place preceded by the proper toilet of cavity. A grass-line ligature was tied from the post to the mesiobuccal portion of the wire next to the molar. The patient was seen every two weeks and the progress noted in the x-ray picture occurred in about four months' time. Teeth should not be moved too rapidly, and nature should be allowed to help all it can. It is believed that with a little guidance the teeth will erupt into occlusion if the space is retained.

CASE 3.—A boy twelve years old had a second deciduous molar suppressed. (Fig. 9.) The first permanent molar was inclined mesially and was banded for orthodontic treatment. An x-ray picture showed the second deciduous molar roots not absorbed and the first premolar near the point of eruption. The boy was advised to have the second deciduous molar tooth removed and the space retained with the appliance. If this case had received no attention, the first premolar would have erupted and the deciduous second molar would have been pocketed from both sides.

Fig. 9.

In cases of submersion found in older individuals from eighteen to twenty years old who have no permanent premolars, a bridge should be constructed. The construction of a bridge will vary as to the age and as to the size of the pulp chamber. A child in early teens is best treated with some type of retainer.

In the teens a patient may become a highly nervous individual. The pressure of the growing premolars inferiorly against the canal or laterally against another tooth is abnormal. The interproximal relationships of these cases cannot be normal because the contact is much lower on the permanent teeth, and a wedge is formed allowing the food to pack. Normal occlusion is destroyed. The second premolar of the maxillary arch drops down to meet its opposing tooth. This makes the interproximal relationship of the maxillary teeth faulty and invites destruction. Therefore, it is imperative that one should recognize and correct these conditions.

CONCLUSION

The anatomic differences between deciduous and permanent teeth should be recognized and these cases treated early. Knowledge of the periods of exfoliation will aid in the diagnosis of any case. Such knowledge many times will be the determining factor as to whether one should retain or extract a tooth.

An x-ray examination is absolutely necessary in children's work because it shows the amount of resorption, the infection if any, and the relationship of the teeth.

Mental and physical health are both considerations in this type of case. It is possible to have pressures make an individual very irritable and nervous. The growth of the premolars continues, and when there is no chance for eruption a disturbing pressure may be the result. An irritable or nervous individual certainly cannot attain the mental efficiency of a normal person. School work and happiness of an individual would be lessened. Health may be impaired by the formation of pockets. Other teeth may lose their normal alignment and their contacts may be destroyed. These terminate in more pocket formations and tissue destruction resulting in the final loss of the entire arch.

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PSYCHOLOGIC REHABILITATION OF A CHILD WITH THE INSERTION OF A PROSTHETIC RESTORATION

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WHAT can be done in cases of early multiple loss of deciduous teeth? A child who has had a great number of extractions in earlier life grows up with a mutilated case of malocclusion. The correction of the malocclusion is difficult and time consuming, thus making the fee prohibitive for the average family. The effects of the abnormal occlusion with its accompanying traumatic occlusion and disfiguration are well known and need not be considered in this paper. Can anything be done to intercept or retard the progression of the eventual malocclusion?

In adult practice various appliances, such as bridges, partial, and full dentures, have been used to prevent abnormal movement of teeth. These have also been used in pedodontia, but their use has not been universal. The child who is

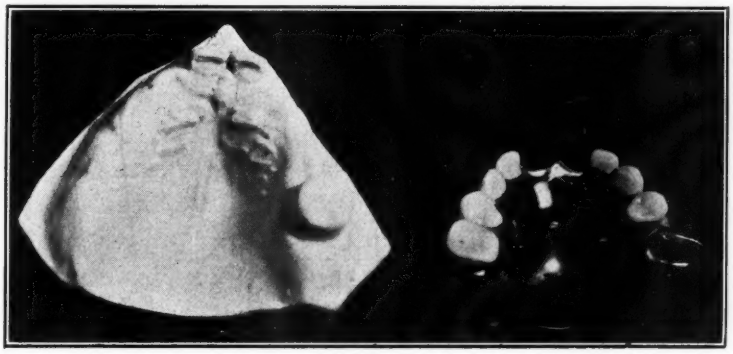

Fig. 1.

required to wear one of these appliances is looked upon with sympathy by both the profession and the laity. It is too bad that the child has lost his teeth, but, on the other hand, he is quite fortunate to have something that he can masticate with, something that will help stimulate normal development of his jaws, and something that will make him feel on a par with other children because he no longer is "toothless."

There have been various bridges and dentures constructed and worn by children. Fig. 1 shows an appliance which is being worn by one of my five-year-old patients. The history presented at the first visit is as follows:

Prenatal.—The mother refused to drink more than one glass of milk daily and frequently not that much. During pregnancy she became anemic.

Postnatal.—The child had the good fortune of not having any of the diseases of infancy or early childhood. She was allowed to have a bottle until she

was slightly over three years of age. At that time the bottle was discontinued, and the child refused milk in any form until her first visit to this office two years later.

On the first visit she presented herself with a marked edema of the upper right side of the face. She was very uncooperative, and radiograms could not be taken although several attempts were made. Visual examination disclosed a protrusion of the maxillary arch which was probably due to prolonged use of the bottle. Exposures of the following deciduous teeth were seen: maxillary left lateral incisor, canine, first and second molars, maxillary right lateral incisor, canine, and first molar. These teeth were extracted, and the child reported in a more favorable mood at subsequent visits. The second deciduous maxillary left molar was carious and badly broken down. The pulp was extirpated and filled with thymolized calcium phosphate paste. A gold crown was used to restore the tooth so that might serve as an attachment and also open the bite which had closed.

In the maxillary arch the remaining teeth were the above mentioned molar and two deciduous central incisors. A half round wire clasp was fitted for the molar and a semiclasp rest was made for the anteriors. The denture was finished in vulcanite. Before the denture was ground into occlusion, the child had overcome the difficulty in speech which she had encountered upon the initial insertion.

In cases of multiple extraction one is concerned with a problem more difficult than just a dental procedure. The dental deformities, per se, may be corrected when they occur or may possibly be prevented with an adequate regime, but it is very important to consider these deformities as frequently being responsible for defects of bodily and mental health. Physically the development of the child will be impaired because of the deficiency of coarse foods and their component parts in the diet. Roughage will be lacking. Constipation, along with a lowered resistance to disease, accompanies a diet deficient in roughage, i.e., whole wheat grains, raw vegetables, and fruits. In general we shall probably have an underdeveloped individual.

Preventing the establishment of an abnormal psychologic complex probably calls for action even if we choose to ignore everything else. Because pain in the oral cavity manifests itself long before the extraction, the psychology of the child becomes altered. Fear of dentists causes him to conceal his difficulty, and continued pain usually drives him away from his normal contacts. Pain dulls his mental development as well as his physical appetite. His parents become worried and usually know nothing of the cause until the pain becomes so great that the child can no longer suppress it. The infection becomes acute with obvious swelling, redness and pain. The teeth are extracted, and soon he becomes even more conscious of the fact that he is different from his friends. His friends eat everything; perhaps they poke fun at him because he has so few teeth or because of the change in his facial expression. All this drives him further away from his playmates and he becomes hermitic.

This patient was just this type. She could be interested in nothing that usually interests children of her age. Her favorite pastime was helping her

mother with the housework. She refused to go outside and play with other children in the neighborhood. In the office nothing could attract her attention, no interest was shown in the playthings which usually attract both older and younger children.

Since the denture was inserted, the child has taken a new lease on life. She is beginning to seek the company of other children. She has acquired a "boy friend," Billy, whom she believes can qualify as a dentist because he is "fat." *She has had her first piece of toast in eight months.* The child's mother reports that at her daughter's fifth birthday party she was the perfect hostess and played with the other children there.

Of course the future of her oral condition must be considered. Dr. Willett,[1] of Peoria, Ill., has shown that in a child of three years, lateral measurement across the region of the second deciduous molar is identical with that of a child fourteen years of age. On the other hand, even if full development has not been attained, it will be difficult to expect normal development, but with the stimulation of normal mastication this growth will be promoted. Longitudinal growth should be normal because the first permanent molars will not be allowed to drift forward with the denture in place, thus stimulating forward growth of the jaws.

SUMMARY

There is a definite place in child dentistry for prosthetic work.

1. The approach to normality through prosthetic restoration will do much to improve the mental status of the individual.

2. Physically, prosthetic appliances will improve the health and nutrition of the child.

3. Dentally, a mutilated case of malocclusion may be averted by the use of bridges, and partial and full dentures.

Acknowledgment is given to Dr. J. M. Kalina for his aid in the construction of the denture.

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REPORT OF THE COMMITTEE ON STANDARDIZATION OF DENTAL EXAMINATION CHARTS*

AMERICAN SOCIETY FOR THE PROMOTION OF DENTISTRY FOR CHILDREN

DR. FRANK A. DELABARRE, Chairman of the Committee on Standardization of Dental Examinations, made a report before the Section on Mouth Hygiene and Preventive Dentistry of the American Dental Association, July 22, 1930.

Three main recommendations were made: (1) that the examiners be classified to indicate the qualifications of the operators; (2) that dental examinations vary in completeness and detail in direct relation to the purpose for which they are conducted; (3) that the examination should be classified according to specified instruments and technic used.

They recognized further, the need for a selection of data, but made no recommendation of a minimum requirement of data to be reported. They suggested that all reports should specify, as a preliminary, a statement as to the classification employed, and the qualification of the examiner.

This committee feels that the recommendations made by Dr. Delabarre's committee are pertinent and necessary elements in every examination chart, and the committee has therefore made them a part of the chart which it offers.

The committee has examined the dental literature and has found very little evidence of any concerted effort to standardize examination charts. The bibliography at the close of this report will show that many articles have been written in regard to oral diagnosis, little of which has a bearing on our subject.

The committee is convinced that there is a vital need for a collection of data which may be used particularly for the purposes of research, survey, and public education. It recognizes that it is necessary that the data collected be adequate, honest, and reasonably accurate to be truly useful. It further feels that by a minimum requirement of facts of a standardized type, it would be possible to compile sufficient evidence to draw logical conclusions of mutual help to the public and the dental profession.

After studying and comparing a large number of charts, we have selected the model chart which is being presented with this report. There are all sorts of forms used to represent the teeth and their investing tissues, but we have chosen this one because we believe it to be the most accurate and the least confusing.

In regard to the minimum requirement of facts to be recorded, we have chosen those shown on the chart after resorting to the method of including all facts shown on all charts as our basis of beginning, and eliminating those items which we felt were not entirely essential to a minimum record.

We anticipate criticism on the basis of excluding certain items in preference to others, for we realize that no chart could be prepared that would meet the entire approval of every one. We have made such allowances, however. There would be no objection, as an example, if in some instances additional facts were recorded and in others if some of the suggested items were not recorded.

We, of the committee, have a definite conviction that if by any action a standard chart can be made acceptable to a large number of organized dental groups, there will be a beginning of a collection of dental data which will be very worth while. We have dreamed of a central office where standardized data can be collected, which will be available for any one of many practical purposes.

The committee does not feel that its work has been finished or that many improvements cannot be made. We should like to see the work carried on, refinements made, and a direct effort started at once to carry out its purposes.

*Presented at Chicago, August 7, 1933.

The detail of the suggested examination chart in this report, was further discussed from a slide projected on the screen.

Respectfully submitted,
DR. LON W. MORREY,
DR. SAMUEL D. HARRIS,
DR. F. BLAINE RHOBOTHAM, Chairman.

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THE SKYTEBACKS IN MOUTH CANYON

A Fourth Grade Dental Health Story

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TWO little Skytebacks started out one day for an adventure.

They had bright eyes and strong bodies and did not mind long walks or steep climbing if there was anything new to see or learn on the way.

Out into the cold they went. The wind blew them first this way and then that and finally lifted them from their feet entirely. They enjoyed their ride on the wings of the wind but felt a little anxious about where and how they were going to land.

Suddenly they came down on both feet right at the mouth of a big cave all painted red around the opening and as far inside as they could see.

They felt warmer as they stood in the doorway and so decided that it must be comfortable and cozy inside. As soon as they stepped over the door sill the door closed, and they found themselves in total darkness. They stood very still for a few moments, too frightened to move. Then they began to wish they could see if there really was anything to be frightened at.

Their wish was soon granted for they began to see the outlines of a big stone wall which was all white and glistening. Up to the top of the wall they climbed and looking up saw another wall just like it fastened to the ceiling. They were just ready to take off their wraps and make themselves at home when a great red monster suddenly rolled over and lifted its head so close to them that they nearly fainted with fright.

"Who comes there?" he shouted. The two little Skytebacks tried to be brave, realizing that fear could not help them a bit.

"We are two little Skytebacks," they said, "come to learn all we can about this lovely red cave and its beautiful white stone walls."

"Very well," he said, "but first let me see whether you have left any dirty tracks behind you, for it is my business to keep this place clean. I cannot allow anything in here that would soil or injure what you call 'the stone walls.' I follow very closely every one who enters until I am sure that they mean no harm to me or anything in here. This cave as you call it is none other than 'Mouth Canyon,' through which pass several times a day great loads of vegetables, fruits, grains and milk. I am here to inspect every load, to guide it as it passes through, and push it out the back door as soon as it is all ground and mixed with the water from my 'Saliva Springs.'"

"But what do you grind it with?" asked one of the little Skytebacks. "That is just what I am going to show you, but you will have to get down from that stone wall and come in here with me in order to be safe while I start things going."

Just then the door opened and in came a carrot. It got no farther than the spot where the two little Skytebacks had been standing a few seconds before when everything began to move, and they saw that carrot cut and mashed into a mass of pulp by those two stone walls.

They were so astonished that they hid under this big red monster until every bit of the carrot was forced out the back door. Then one little Skyteback ventured to ask, "Who are you, anyway?" He answered: "I am King Tongue, the ruler of Mouth Canyon and keeper of the most wonderful mill in the world. You may call it a stone wall if you want to, but it is not stone at all. It is two rows of priceless pearls which must be kept spotlessly clean and shining and protected from anything which would scratch or mar their beauty and usefulness. No amount of grinding will hurt them when they are given the right kinds of material to grind. In fact grinding is good for them, but they must be thoroughly brushed and cleansed as soon as their work is done. They are very valuable and everything should be done to protect and preserve them. These pearls all have names. Right where you were standing when I first saw you are the incisor or scissor pearls. They do the cutting up of the material brought to the mill. Next are the canine or tearing pearls. They tear the material to pieces and get it ready for the next or premolar pearls. These are the breaking pearls and crush the material into smaller fragments. Next are the molar or grinding pearls. They grind the material to a pulpy mass and get it ready to be pushed out the back door.

"Now if you begin with a center pearl in both upper and lower walls, and count back to six on each side, you will come to the four most valuable pearls of all. If they get broken or ruined, they can never be replaced, and the grinding walls will be weakened, and much harm will come to the entire canyon. These four most precious pearls are called the first permanent molars. They must be watched and guarded very carefully. Nuts must never be cracked with these pearls, and all foreign material substances must be kept out of the cave or great harm will come in and destroy the pearls and injure the pulpy mass which the mill grinds for consumption in the kingdom.

"Now, you must move on for it is past cleaning time and I must get busy." Just then the door opened and in came a big brush which turned first one way and then another. The little Skytebacks dared not linger a moment or they would have been brushed to pieces and washed away, for just as they were hustling to get away there seemed to be water everywhere.

The little Skytebacks hurried home jabbering about all that they had seen and heard. They were so glad to be able to tell the other little Skytebacks all about the beautiful walls of pearls. They told over and over again the words of King Tongue, "begin with a center pearl in both upper and lower walls and count back to six on either side and you will come to the most valuable pearls of all."

Is it any wonder all the little Skytebacks have good teeth and that they are clean and strong?

THE DEVELOPMENT OF CHILDREN'S DENTISTRY IN A GENERAL PRACTICE

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THE possibilities of children's dentistry in a general practice are unlimited if you consider it a pleasure rather than a burden. There are certain steps to be followed in building a practice of this type; for example, education of the parent, manner of handling children, and office surroundings.

Dentists, working daily with the conditions of the mouth, are inclined to believe that the general public should know what happens in the mouth without being told. If this were truly the case, we should not find so many unfortunate conditions presenting in our practices. A dentist who has his profession at heart should not fail to take advantage of the opportunity presented when parents come into his office. It is the golden opportunity to explain what will happen in a child's mouth when teeth are erupting and why this natural change should not be interrupted. Explain while you are working, why the loss of a deciduous tooth is a serious thing and will impair the normal growth of the permanent arch by allowing the permanent tooth to move about at will and thus cause an abnormal occlusion; also, that abnormal muscle pressure due to mouth-breathing has a tendency to narrow the arch, and explain what the causes are.

Parents are eager to know all they can about their child and will make an effort to prevent such deformities, because no parent wants his child to be handicapped in society by a disfigurement which could have been prevented. The only possible way to prevent such a condition is to start the child to the dentist at an early age in life and to continue with frequent visits so that abnormal conditions can be detected and corrected before damage has been done.

Parents must be educated in order that we may have their cooperation. We cannot go along as we have been and expect the parents to acquire the knowledge of conditions of the mouth and how they develop, by themselves. It just is not done. Therefore, we must adopt some means of educating the public, and this is no small task. There are several methods to follow, such as health talks to clubs, parent teachers associations, talks on the radio and articles in magazines, but they must come from the dental profession rather than through outside advertising.

If we educate the parents in children's dentistry, get them dental minded, the periodical examination of the child becomes a definite item in the family budget, and the nominal fee that is charged is no longer considered a loss but rather a profit. While the fee is not large for the examination, there is usually other work to be done and the dentist gets his profit from this. It has the same economic significance that a full-mouth x-ray examination has in an adult case, where additional work is found that would not have been found otherwise. Do

not be led to think from this last statement that in examining a child's mouth a full-mouth x-ray examination is not essential. The abnormal conditions that present themselves are startling, and there is nothing more convincing to the parent than an x-ray picture of his own child's mouth, whereby he can visualize how the dentist has arrived at his diagnosis.

An important economic fact in relation to educating the parent, is selling the idea to that parent that his child should have the best that he can afford rather than just something to get by, as is often the case. A few dollars spent now might save hundreds of dollars later on. Our motto for parents should be: "We love our children—give them the best care we can afford." It has only been in the last few years that preventive dentistry has become our aim and has taken its place as a profit-sharing part of our practice.

The only phase of psychology in economics bearing directly on the child is the value of saving time. You cannot sell dentistry to the child, but you can and must sell yourself. Fear is the main obstacle to overcome in child dentistry. Once you have gained the confidence, trust and liking of the child, your work will progress with very little loss of time. If there are men in the dental profession who do not care to work on children, or who do not have the patience to work with children, they should be broad-minded enough to send their child patients to men who specialize in that work. It would save many a child the fear of going back to a dentist and would even prevent dental cripples.

It is advisable to see the child patients as early as three years of age so you can become acquainted. Make the first visit a pleasant one, and create a desire to return rather than a fear. This also aids us in obtaining cooperation of the parent, because it is so easy to put off the regular visit if it is an effort to bring the child in. Unfortunately we cannot always expect a child who has no fear of a dental office; therefore the dentist and his assistant must cultivate personalities which will draw a child to them and break down that barrier of fear. The remarks in a reception room should be made directly to the child, and the doctor and nurse must be quick to survey the situation which presents itself. Make an attempt to get the child to talk in order that you may get a lead and fit your conversation right in with his trend of thought.

After a child has been brought to the chair, everything should go like clockwork. No patient appreciates the loss of time while you are looking for a record or waiting for instruments to be brought from the sterilizer, least of all a child who is more nervous on entering your office than after you have proceeded with the work. The assistant should have the examination record where you can see at a glance what you have outlined to accomplish for the appointed time, as estimations on junior work are based on the number of appointments required to complete the case.

In general practice it is necessary to reserve definite hours for children of school age, for example, three to five during the school week and Saturday mornings. This gives us about twelve hours of junior working time over a period of a week. Estimating our time on junior work at $6 per hour, it would make it possible to receive $72 per week, $288 per month; realizing that some operate on a higher and some on a lower hourly basis, $6 is a fair average. Sup-

pose we are conservative, and say $200 per month on junior work; it would represent a nice income while developing future business.

Another important phase of children's dentistry is a good system of following up the periodical examination. It is just as important to follow up the periodical examination as it is to finish the patient properly. I asked a friend of mine who is not a dentist what he thought was the most important factor in child dental economics. He said the fact that you call when it is time to come in for a prophylaxis and examination not only helps you, but saves many a dollar for the parent. Now if people outside the profession can see that, how easy it would be to systemize your practice to a specific income.

Surroundings play a big part in the promotion of junior dentistry. A room decorated and equipped as a junior room appeals to the imagination of a child and helps in creating confidence in the dentist which will relieve the tension and fear when the child approaches the dental chair. Parents are also favorably impressed when they realize that you have the interest of their children at heart. If it is impossible to have an individual junior operating room, it is very simple to arrange a children's corner in your reception room.

Children's dentistry, if properly developed, is of far more interest and pleasure than an adult practice, but the most important fact is that your junior practice of today becomes your adult practice of tomorrow.

EDUCATING THE GENERAL PRACTITIONER ON ORTHODONTIA AND CHILDREN'S DENTISTRY

HARRY H. SORRELS, D.D.S., OKLAHOMA CITY, OKLA.

DENTISTRY needs preventive education about as much as does the public. What shall we do about it?

Among the many shortcomings of the dental profession, there is at least one that takes precedence over the rest: that is the failure of many dentists to have the proper philosophy of preventing or minimizing dental troubles which to a great degree have their inception in the child.

This failure on the part of dentistry today had its beginning in the dental schools of the country which did not in the past years carry the message of prevention and which failed to provide adequate instruction in children's dentistry.

This condition has to a great extent been corrected in the schools, and is still being improved upon, but for the great mass of dentists now in practice this will be of little help.

It is, therefore, a real problem for those interested in the preventive movement to get the message over to those most in need of it.

It is true that many journals carry good articles on this subject, but their circulation is limited; and although the articles appear in the trade journals with a national circulation, they are lost in the mass of advertisements. Such articles, even though they are good, are usually too long and scientific to leave the reader with a clear understanding of the basic principles under discussion. As a rule they do not appeal to the busy man and many readers are lost.

Many of the most commonplace things needing attention are entirely overlooked from year to year without any special effort made to correct the many erroneous ideas and fallacies of practice. Postgraduate courses of instruction are good so far as they go, but they reach only a few men, so their results are very limited.

After this general summary of the problem, it would seem that there was no satisfactory answer. The Oklahoma plan, however, offers a unique and practical way of helping to solve it. Briefly it is this:

A section of two or more pages in the periodical of the state dental society is allotted to preventive problems and treatment. The articles are very short and pointed. They deal with both the unusual and the commonplace things encountered in the daily routine of practice. They are mainly deductions on methods of treatment prescribed by the contributing orthodontists or phrases quoted from authoritative men outside the state.

In the Oklahoma program of education, the pages are edited by a group of orthodontists in the state and carry no editorship to avoid any one individual getting advertisement out of it. No state men are quoted in the copy

for the same reason. When men outside the state are quoted, they are duly credited. If it is gathered direct, it is credited to the individual, and if gathered indirect, proper acknowledgment is made to both the writer and the publisher. A small amount of editorial copy and news items are frequently carried to give the section more general interest.

The state orthodontia society pays for the actual cost of printing the pages.

This plan has been so favorably received on account of its general educational value and altruistic purpose that it would not be surprising if the state dental society would assume the expense of publication, since its members and their patients are the principal benefactors.

The program will undoubtedly reflect itself in causing the dentist to recognize more potential and confirmed cases of malocclusion at an early age. With preventive treatment in dentistry so dependent upon the timely application of many different kinds of operative service, a better understanding of its possibilities opens up a neglected field for more work. It should, therefore, command the respect of all practitioners interested in the promotion of a better dental service for children.

(Reprinted from the Bulletin of the Oklahoma State Dental Society)

Preserve the Contact Point

It is just as essential, if not more so, to preserve the contact point and the interproximal space in the deciduous teeth as in the permanent teeth. The contact point serves an important function in the prevention of irregularities of the teeth.

It prevents the posterior teeth from shifting forward, shortening the lateral halves of the dental arch.

The contact point is important in promoting the development and growth of the anterior segment of the dental arch through the stimulus of the successive eruption of the first, second and third permanent molars.

Many underdeveloped jaws in the anterior portion (and crowded teeth) are due to loss of contact points at the beginning.

An improper contact point interferes with development through loss of function, an important stimulant to growth and development. A child cannot chew properly with broken contact points.

Let's not overlook the contact point.

Lateral Growth

It is believed that very little if any growth takes place in the anterior third of the mouth after ten years of age; therefore if a crowded condition exists, it is unlikely to correct itself any.

Third Molars

There are few people who have sufficient room to erupt their third molars normally; it is therefore advisable to check up radiographically this region around fifteen to twenty years of age to find existing conditions. If horizontal impactions are found, they should be removed, being sure to remove in its entirety the tooth bud, as frequently the apical third is not completely calcified.

Preventive Minded Parents

In this day of prevention, many parents are becoming so preventive minded that they are taking their children to the dentist, as well as to the physician, at an early age in order to minimize the chances of dental troubles. Are you ready and anxious to serve them and counsel them intelligently to meet this challenge?

Clinical Steps Necessary

The clinical steps necessary in order to advise and counsel parents correctly are:

1. X-ray pictures of all teeth.
2. Models.
3. Provide all necessary operative work.

Time to Start

Children should be brought to their dentist at least by the age of three, and continue under his observation and care throughout life.

Preventive Measures

In counselling your patients on preventive dentistry, should any orthodontic problem confront you, seek the advice of your orthodontic friends—they will be glad to advise you relative to the prognosis of any case.

Half Price for Children

Do not charge half price for children. Their work is as important as, or more so than that of adults, and whoever heard of a physician charging half price for child service?

Charge a consistently fair fee for the amount of time used and the class of work rendered, but do not permit parents to assume that you can give an hour of your time for a child at half the basic charge for an adult patient. There is nothing so inconsistent.

How to Jump a Tooth

It is not uncommon for a deciduous or permanent tooth to erupt or through a blow be forced lingual to normal occlusion. Frequently this misplaced member can be restored to normal position by having the patient bite on a large cotton roll, which will hold the bite open, then use a tongue depressor and contact the misplaced member with it, using lower teeth as fulcrum, or vice versa.

Loss of Permanent Teeth in Youth

The loss of permanent teeth in youth always offers many problems in the retention of areas until permanent restorative work can be instituted. We therefore offer suggestions to cover several regions at different ages.

Loss of Mandibular First Molar

The loss of the mandibular first permanent molar causes the greatest damage of any loss of permanent teeth at this age, and everything should be done necessary to correct the damage. It is almost always necessary to bring the second molar mesially in vertical position orthodontically as soon as it erupts in order to prevent subsequent collapse of the anterior teeth distally.

Loss of Maxillary Central Incisor—Age 10

We would advise using an open face crown on the opposing central incisor, using steel facing ponties with reat on lateral incisor.

Loss of Maxillary Lateral Incisor

We would again advise use of open face crown, using central incisor as abutment, as permanent cuspid has not as yet erupted.

Loss of Maxillary First Molar

The loss of the maxillary first molar generally offers no need of serious despair because the second molar will generally assume the first molar's place, and in good position.

Loss of Mandibular Incisor

The use of the open face crown or orthodontic band as abutment is again the indicated abutment, with steel facing as the pontic.

It is more desirable to build strong boys than to repair grown men. (From six to sixteen.)

Department of Orthodontic Abstracts and Reviews

Edited by

DRS. EGON NEUSTADT AND JOSEPH D. EBY, NEW YORK CITY

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. Egon Neustadt, 133 East Fifty-Eighth Street, New York City.

Breast Feeding and Bottle Feeding. Abstracted from "Vom Stillen des Saeuglings" by K. F. Hoffmann, Deutsche Zahnaerztliche Wochenschrift, 1933, Berlin, Zentral-Verein deutscher Zahnaerzte.

One of the main objects of modern dentistry is the prevention of dental disease and dental abnormalities. Among preventive measures, the correct nutrition of mother and child is preeminent. It should be instituted during the prenatal period and carefully supervised during the first two years of babyhood. Correct nutrition refers not only to quantity and quality of the food, but also to the manner in which it is partaken.

In bottle feeding and in mixed feeding, the use of a proper nipple is of great importance. It goes a long way in eliminating etiologic factors in the development of malocclusions. A study of the differences between breast and bottle feeding demonstrates the reasons supporting this statement.

THE PHYSIOLOGY OF BREAST FEEDING

When the baby sucks on the mother's breast, its lips are pressed tightly against the areola of the nipple and, in this manner, a vacuum is created inside the mouth. During the sucking motion, the mandible is lowered and pushed forward. The muscles of tongue, cheeks, lips and pharynx are called upon for a combined and vigorous action. Through the pull of the muscles during their contraction, a healthy stimulation is exerted upon the bones of jaws, mouth, and nose. Through the vacuum created in the mouth cavity, the secretion of saliva is facilitated, and the milk, therefore, is constantly mixed with saliva. This abundant flow of saliva again causes, through a reflex action, a secretion of the glands in stomach and intestines.

BOTTLE FEEDING

The situation is quite different in artificial feeding. A vacuum in the mouth cavity is not being created because the lips cannot make an air-tight contact with the average soft rubber nipple; if they did, they would compress it entirely and the flow of milk would cease. For this reason, air is continuously being swallowed by the baby. Furthermore, the salivary glands have only a diminished secretion. The feeding itself takes place at a faster

rate, because the hole in the nipple is usually too large. The swallowing of air, the diminished secretion of saliva, and the quick intake of milk lead to digestive disturbances often associated with bottle feeding.

Furthermore, the changed mechanical conditions have an undesirable influence upon the teeth and upon the development of the skull bones. Experiments have revealed that with the use of an ordinary nipple a pressure of 500 gm. is being exerted on the palate. The muscles of lips, cheeks, and pharynx, on the other hand, are not functioning sufficiently. Through the abnormally high pressure, the delicate bony tissues are being transformed, and the palate becomes higher, mainly in its middle portion. The nasal cavity is hereby narrowed in, and the septum may be caused to deviate. Mouth-breathing is not infrequently invited by these manifestations of abnormal function.

Several new types of nipples have been designed in order to overcome these detrimental changes. All of them have as their main purpose the best possible imitation of natural conditions. One of these specially designed

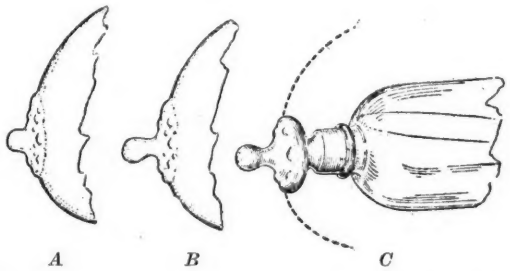

Fig. 1.—*A*, normal breast; *B*, breast during nursing; *C*, "Natura" nipple.

nipples has an end which is thin and which has the same shape as the end of the human nipple. Then follows a much wider and more resistant rubber portion (Fig. 1). This compares with the areola of the human breast, and it contains a few tiny openings which are arranged very similar to the opening of the female milk ducts. (Several American manufacturers place similar products on the American market, for instance the nipples of the Davol line, and the Hygeia nipple with the extra wide bottle. Imported products are the "Poupon"—and the above described "Natura" nipple.)

Natural conditions are so closely reproduced in these modified nipples, that no untoward effects are noticed if they are used in bottle feeding. Furthermore, they overcome a great difficulty in mixed feeding, when the mother's milk is not sufficient in quantity, because the change from sucking at the mother's breast to sucking at the new nipple is not striking enough to be noticed by the baby. The weaning of the baby is also made easier, as it is already used to exerting greater efforts in its food intake.

E.N.

International Journal of Orthodontia and Dentistry for Children

PUBLISHED THE FIFTEENTH OF EVERY MONTH BY

THE C. V. MOSBY CO., 3523-25 Pine Blvd., St. Louis, Mo.

Foreign Depots—*Great Britain*—Henry Kimpton, 263 High Holborn, London, W. C.; *Australasia*—Stirling & Co., 317 Collins Street, Modern Chambers, Melbourne; *India*—"Practical Medicine," Egerton Street, Delhi; *Porto Rico*—Pedro C. Timothee, Rafael Cordero 68, San Juan, P. R.

Subscription Rates—Single Copies, 75 cents. To any place in United States, Cuba, Porto Rico, Canal Zone, Mexico, Hawaii and Philippine Islands, $7.00 per year in advance. Under foreign postage, $7.40. Volume begins with January and ends with December of each year.

Remittances—Remittances for subscriptions should be made by check, draft, post office or express money order, payable to the publishers, The C. V. Mosby Company.

Contributions—The editor will be pleased to consider the publication of original communications of merit on orthodontic and allied subjects, which must be contributed solely to this Journal.

Opinions—Neither the editor nor the publisher holds himself responsible for the opinions of contributors, nor are they responsible for other than editorial statements.

Reprints—The publishers will communicate with authors regarding reprints upon publication of paper.

Communications—Contributed articles, illustrations, letters, books for review, and all other matter pertaining to the editorial department should be addressed to the Editor, Dr. H. C. Pollock, 4482 Washington Blvd., St. Louis, Mo. All communications in regard to advertising, subscriptions, change of address, etc., should be addressed to the publishers, The C. V. Mosby Company, 3523-25 Pine Blvd., St. Louis, Mo.

Illustrations—Such half-tones and zinc etchings as in the judgment of the editor are necessary to illustrate articles will be furnished when photographs or drawings are supplied by the authors of said articles.

Advertisements — Objectionable advertisements will not be accepted for publication in this Journal. Forms close first of month preceding date of issue. Advertising rates and sizes on application.

Change of Address—The publishers should be advised of change of subscriber's address about fifteen days before date of issue with both new and old addresses given.

Nonreceipt of Copies—Complaints for nonreceipt of copies or requests for extra numbers must be received on or before the fifteenth of the month of publication; otherwise the supply may be exhausted.

Entered at the Post Office at St. Louis, Mo., as Second-Class Matter

EDITORIAL

Flowers for the Living

FIFTEEN years ago an industrial school for boys was founded at Hershey, Pa., by Mr. M. S. Hershey. Boys from four to seven years old are admitted, and they may remain at the school until they are eighteen. They are given an education preparatory to college or any vocational training they desire. Provision has been made for fifteen hundred boys; the present enrollment is between eight hundred and a thousand. Separate homes for groups of twenty, each home under the personal supervision of a house father and a house mother, provide an ideal environment. A detailed account of the school appeared in a recent issue of *Fortune*.

A modern and elaborately equipped hospital is provided at the school, a dental department, and recently also an orthodontic department. This orthodontic service may in the future be invaluable for research. In private practice the added cost to the patient often prevents, to some extent at least, a systematic follow-up of many cases. Even in the short time that has elapsed since the establishment of the orthodontic department at the Hershey School, it has been shown that incipient dental caries is much more common than has usually been suspected. A careful check-up of untreated cases, by an orthodontist, will do much to refute the argument that appliances may be a positive factor in causing decay during orthodontic treatment.

Since the orthodontist in this school does not have to consider the time factor, cases may be treated as long as desired. Normal growth and development may be recorded and observed without thought of the expense, and various mechanical therapeutic measures may be applied and the results observed without partiality to any system. Since the boys remain in the school for many years, a continued check-up is possible. This following-up of cases is very uncertain in private practice and is impossible in the usual free clinic. With positive control over appointments and with the assurance that instructions will be followed, it may be possible to prove more definitely why certain failures occur in private practice.

The American Society of Orthodontists has spent a considerable amount of money on worth-while research. The orthodontic clinic of the Hershey School provides, gratis, a wonderful opportunity to obtain more information. The Society will be gratified to learn that one of its members has been selected as the director of the clinic.

Any endeavor to improve the future of a group of deserving individuals is commendable. Such philanthropic efforts are worth while, but in our daily routine we often fail to credit those who build, without expectation of praise, monuments that will endure long after the builders have departed.

The desire to progress, to learn, and to accumulate worldly possessions of value, is the birthright of all. Assuredly, we should give unstinted credit to those who, having been successful, plan to distribute their wealth wisely. May they know that such giving adds fragrance to the "flowers for the living."

P. G. S.

NEWS AND NOTES

Southern Society of Orthodontists

The thirteenth annual meeting of the Southern Society of Orthodontists will be held at The Homestead, Hot Springs, Virginia, July 16, 17 and 18.

A cordial invitation is extended to all ethical members of the dental and medical professions.

N. F. MUIR, President,
Shenandoah Life Bldg.,
Roanoke, Va.

WILLIAM P. WOOD, JR., Secretary,
442 W. Lafayette Street,
Tampa, Fla.

Association of American Women Dentists

The thirteenth annual meeting of the Association of American Women Dentists will be held at the St. Paul Hotel, St. Paul, Minn., on August 6, 1934.

A cordial invitation is extended to all women dentists.

GENEVA E. GROTH,
1301 Medical Arts Bldg.,
Philadelphia, Pa.

European Orthodontological Society

The annual meeting will be held at the Palace Hotel, Scheveningen, the Hague, on Tuesday and Wednesday, May 22 and 23, 1934. This meeting follows the meeting of the American Dental Society of Europe, and a very generous invitation was received from the A. D. S. E. for members of the E. O. S. to attend that meeting, which is to be held from May 18 to 21.

The E. O. S. program includes papers on the Etiology and Treatment of Open-Bite Cases, and Preventive Orthodontia (Prophylactic Orthodontia).

Papers will be read by Viggo Andressen, L. de Coster, S. Dreyfus, Miss Franzmeyer, G. Korkhaus, A. E. Rowlett, Professor Simon, Georges Villain, F. Watry, and others.

The program is as follows:

MONDAY, MAY 21

21:00 o'clock. Reception by Dutch colleagues.

TUESDAY, MAY 22

9:00 o'clock. Business meeting.
10:00 o'clock. Open session.
11:00 o'clock. Papers—Preventive Orthodontia.
13:00 o'clock. Luncheon by invitation of the E. O. S. to all members and visitors.
14:30 o'clock. Table clinics.
20:00 o'clock. Banquet at Palace Hotel.

WEDNESDAY, MAY 23

9:30 o'clock. Papers.
13:00 o'clock. E. O. S. invitation luncheon (business).
14:30 o'clock. Table clinics.
16:30 o'clock. Concluding business meeting.

President, Dr. Ch. F. L. Nord.

Hon. Treasurer, Mr. O. Henry,
15, Stratford Place,
London, W. 1, England.

Hon. Secretary, G. F. Cale-Matthews,
95 Newhall Street,
Birmingham, 3, England.

Hygiene Commission of the International Dental Federation

The Jessen prize was founded by the Hygiene Commission in 1929. This prize is to be awarded, if possible, every two years, to such organization or individual as shall have rendered the most meritorious service in the field of oral hygiene for children during this period.

The Hygiene Commission of the I. D. F. herewith appeals to the affiliated societies and to the delegates of the various countries, for nominations, suitably documented, of organizations or individuals who in their opinion, should be considered for the award of the Jessen prize, by reason of their work for oral hygiene among children.

These nominations, on which the Hygiene Commission will base its decision, should be forwarded to Dr. Bruske, Jan Willem Brouwerplein 21, Amsterdam, Holland, before June 15, 1934.

For the Hygiene Commission of the I. D. F.

DR. LINNERT (Nuremberg)
President.

DR. J. BRUSKE (Amsterdam)
Vice-President.

DR. C. H. WITTHAUS (The Hague)
Assistant Secretary.

American Society for Promotion of Dentistry for Children

The annual meeting of the American Society for the Promotion of Dentistry for Children will be held at the St. Paul Hotel, St. Paul, Minnesota, August 6, 1934.

Important papers and reports will be given, and important business will be transacted. A discussion luncheon will be held at noon, at which all phases of dentistry for children will be interestingly and informatively discussed.

WALTER T. MCFALL, Secretary,
720 New Street,
Macon, Ga.

Meeting of Psi Omega Fraternity

The annual meeting of the National Alumni Chapter of Psi Omega will be held at the Lowry Hotel, St. Paul, Minnesota, Tuesday morning, August 7.

The annual banquet and ladies' night will be held Monday night, August 6, at 7 P.M. Headquarters and registration will be at the Lowry Hotel.

WALTER T. MCFALL, Grandmaster,
720 New Street,
Macon, Ga.

Notes of Interest

Dr. Barnett Malbin announces the removal of his offices from Suite 613 to 1806-10 David Whitney Building, Detroit, Mich. Practice of orthodontia.

Dr. Herbert E. Ernst has moved his offices to 730 Fifth Avenue, New York, N. Y.

Dr. E. C. Read, orthodontist, announces the removal of his offices to 812 Farmers and Merchants Bank Building, Long Beach, Calif.

Dr. Edward C. Thompson announces that his offices are now located at 826 Beaumont Building, St. Louis, Mo. Practice limited to dental diagnosis and extraction, with special reference to elimination of foci of infection.